



A DVANCED
C ONSTRUCTION
I NFORMATION
D EVELOPMENT LTD.

Building Information Modelling (BIM) Course

(Design, Analysis, Construction Management and Collaboration)

Fuzor

Presented by

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Advanced Construction Information Development Ltd

■ 2018 BD Technical Circular

Annex 1

BIM Uses

1. Works Departments shall adopt the stipulated mandatory BIM uses in respective stages of a project. Works Departments may adopt the optional BIM uses when necessary.

BIM Use	Investigation, Feasibility and Planning	Design	Construction
1 Design Authoring	O	M	M
2 Design Reviews	O	M	M
3 Existing Conditions Modelling	O	M	M
4 Site Analysis	O	M	
5 3D Coordination		M	M
6 Cost Estimation	O	M ^a	M ^b
7 Engineering Analysis		O	O
8 Facility Energy Analysis		O	O
9 Sustainability Evaluation	O	O	O
10 Space Programming	O	M ^c	
11 Phase Planning (4D Modelling)		M ^d	M
12 Digital Fabrication		O	M ^c
13 Site Utilization Planning			M ^f
14 3D Control and Planning			O
15 As-Built Modelling			M
16 Project Systems Analysis			O
17 Maintenance Scheduling			M ^g
18 Space Management and Tracking			O
19 Asset Management			O
20 Drawing Generation (Drawing Production)		M	M

Legend:

M – Mandatory BIM Use for the mentioned stage, including that carried forward from previous stage.

O – Optional BIM Use

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Ref : DEVB(W) 430/80/01
Group : 2, 5, 6

27 December 2018

Development Bureau Technical Circular (Works) No. 18/2018

Adoption of Building Information Modelling for Capital Works Projects in Hong Kong

Scope

This Circular sets out the policy and requirements on the adoption of Building Information Modelling (BIM) technology.

2. This Circular applies to works either by government staff, consultants or contractors.

Effective Date

3. This Circular takes effect on **1 January 2019**.

Effect on Existing Circulars and Circular Memoranda

4. This Circular supersedes DEVB TC(W) No. 7/2017.

1 Introduction

▪ 1.1 Products

	Collaboration Viewer	Ultimate	VDC
Project viewing	✓ (By invitation)	✓	✓
BIM Analysis		✓	✓
Animation System		✓	✓
Build (Construction)			✓
AR			✓
VR	✓ (4D VR Viewing)	✓	✓ (4D VR Viewing)

1 Introduction

▪ 1.2 Minimum System Requirement

- Windows 7 64-bit or above
- Intel Core i5- 6500 or AMD equivalent or greater
- NVIDIA GTX 950 Ti or AMD equivalent with 4GB video RAM or better
- Minimum 8GB RAM
- Minimum 10GB free hard disk space

1 Introduction

- 1.3 File Format and Minimum System Requirement

- Fuzor file format

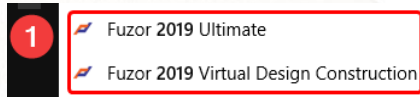


- Support file format

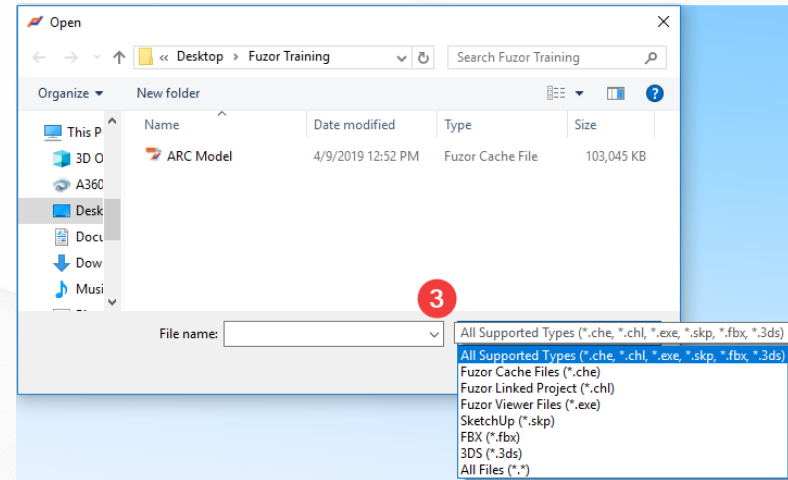
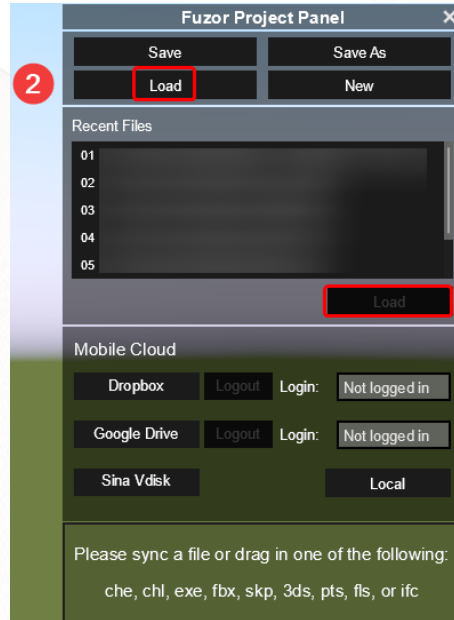


1 Introduction

1.4 Open Fuzor Model (.che)



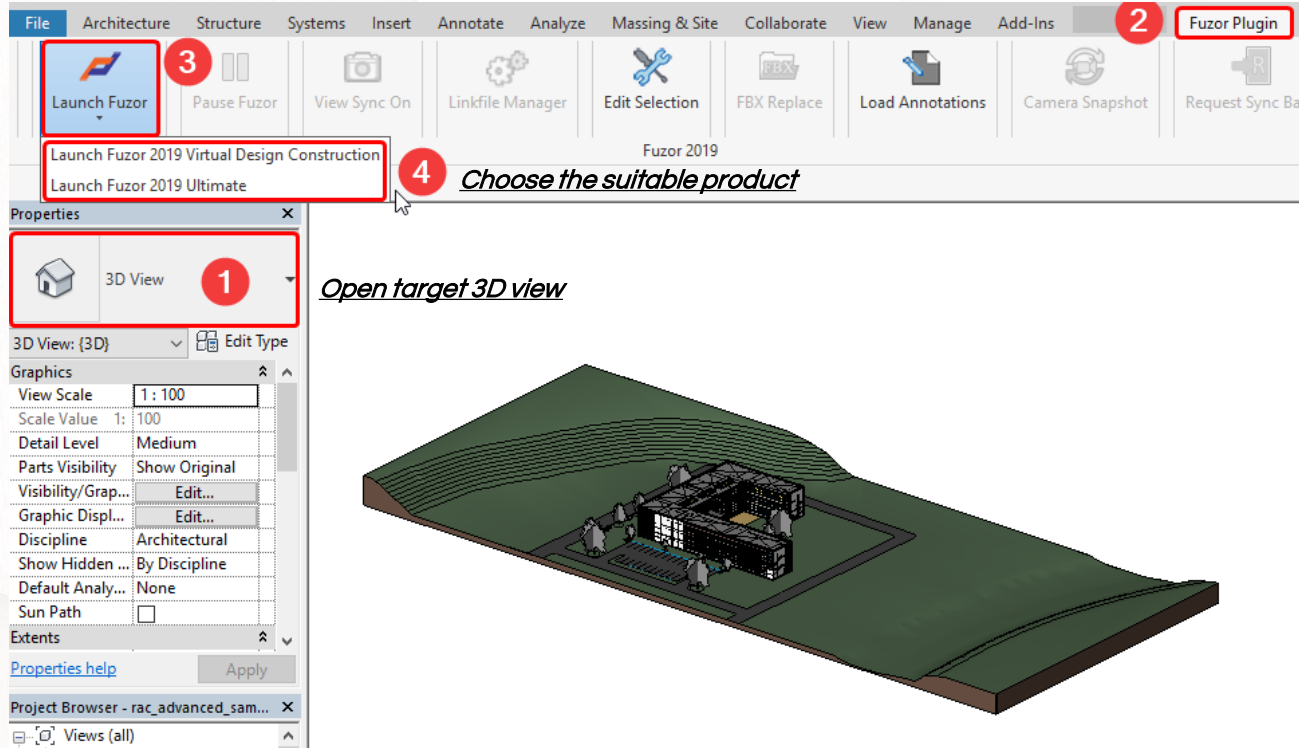
Choose the suitable product



Select suitable source

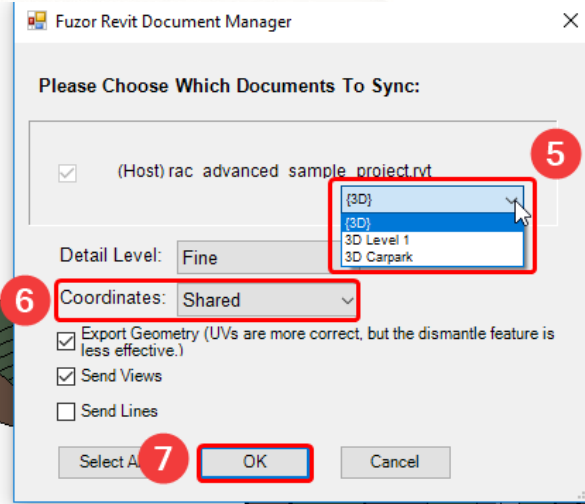
1 Introduction

■ 1.5 Export Revit model to Fuzor (.che)



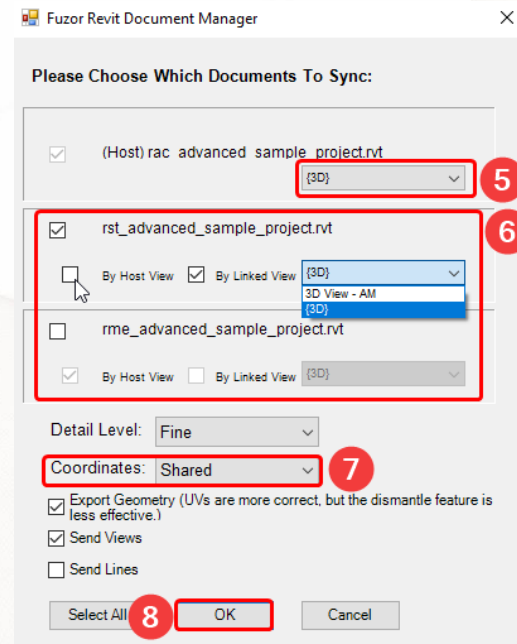
1 Introduction

■ 1.5 Export Revit model to Fuzor (.che)



Define target 3D view

Without Linked Files



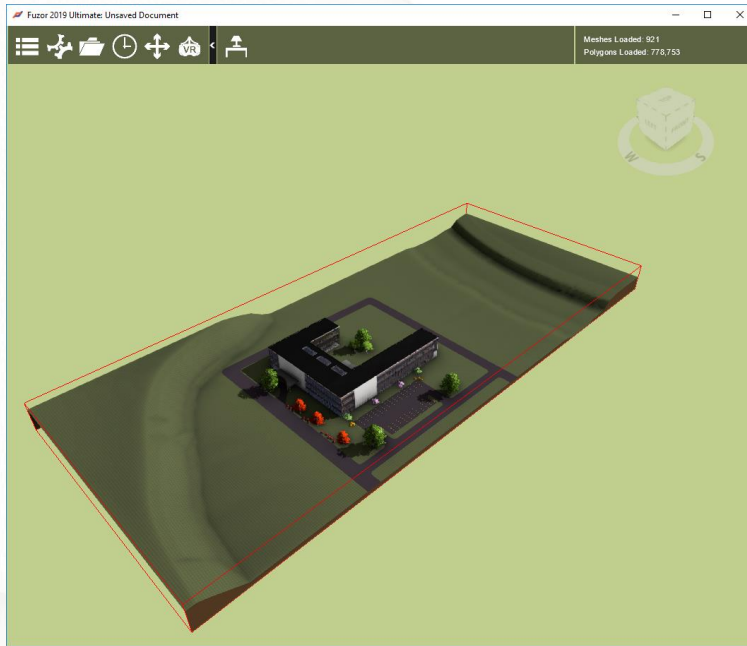
Define target 3D view for host project

Define target 3D view for linked projects

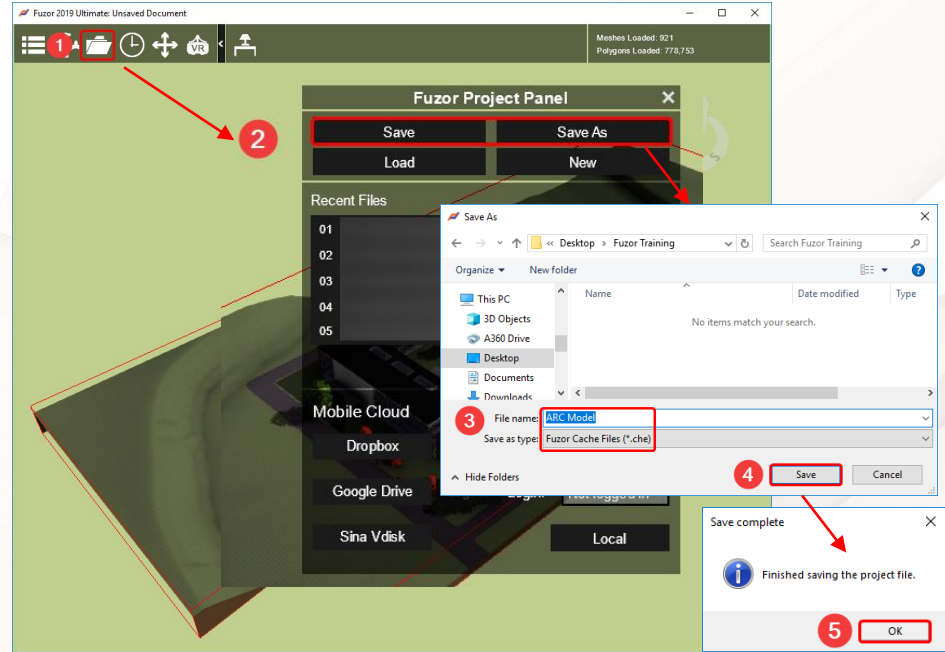
Without Linked Files

1 Introduction

■ 1.5 Export Revit model to Fuzor (.che)



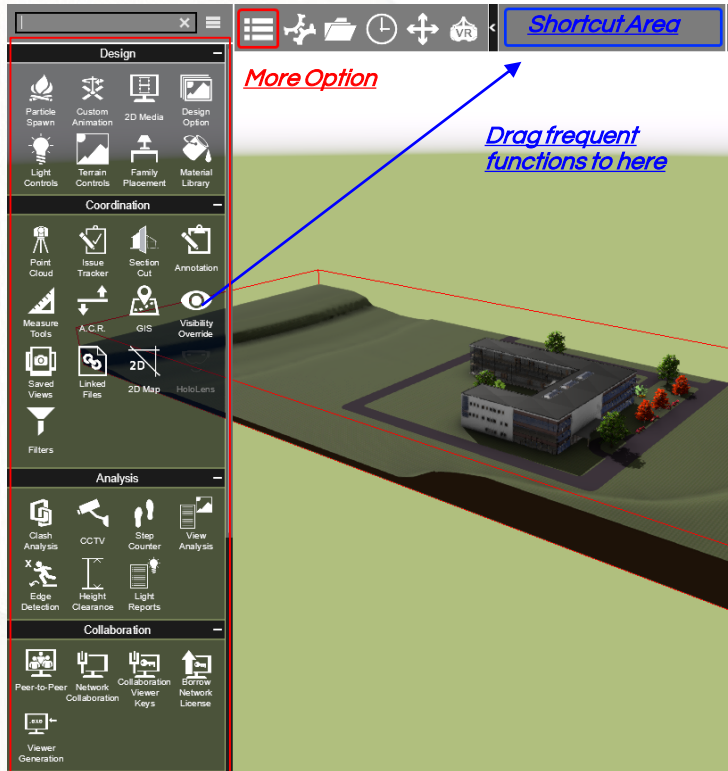
Fuzor Model Exported



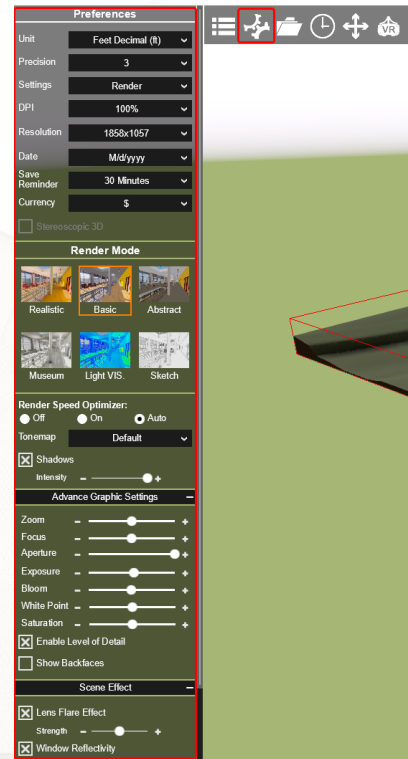
Save as .che

1 Introduction

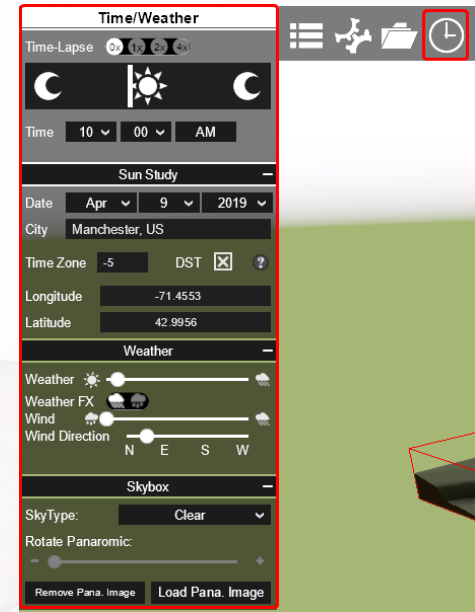
■ 1.6 User Interface



More Option - Functions



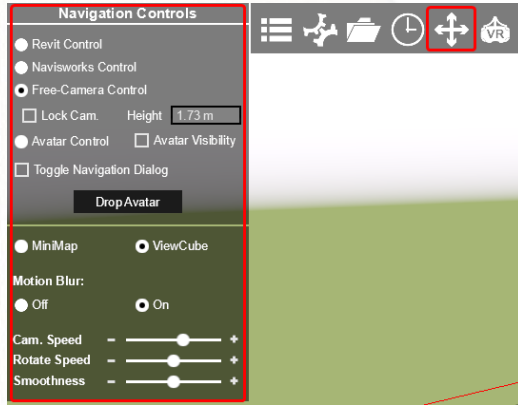
Settings



Time/ Weather

1 Introduction

■ 1.6 User Interface



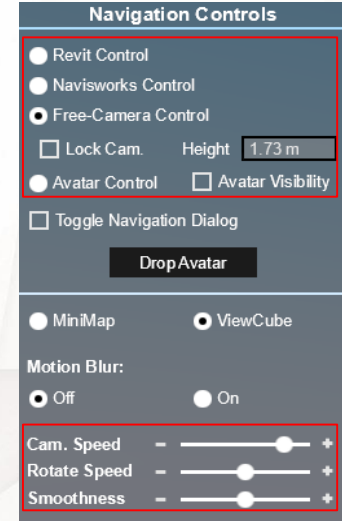
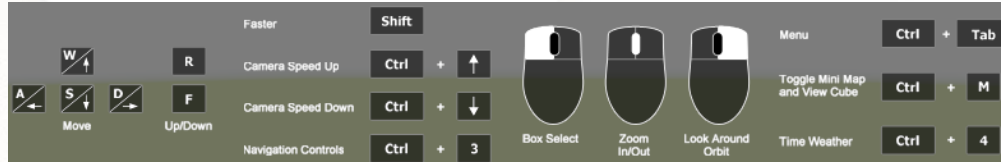
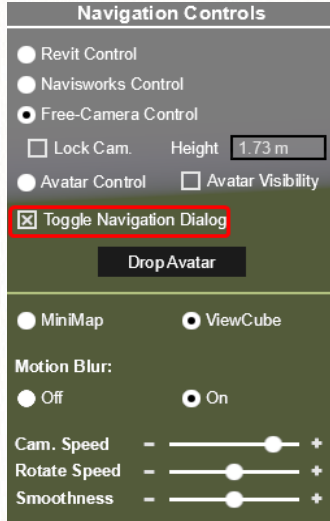
Navigation Controls



VR

1 Introduction

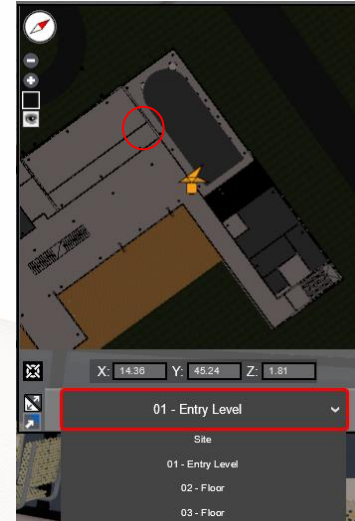
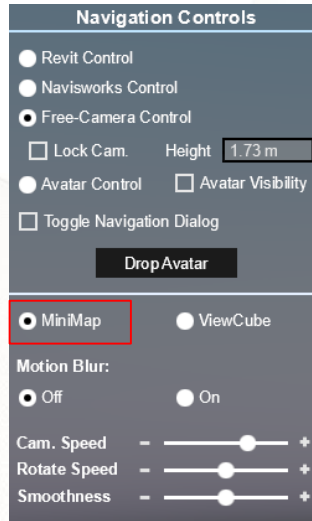
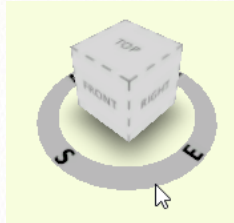
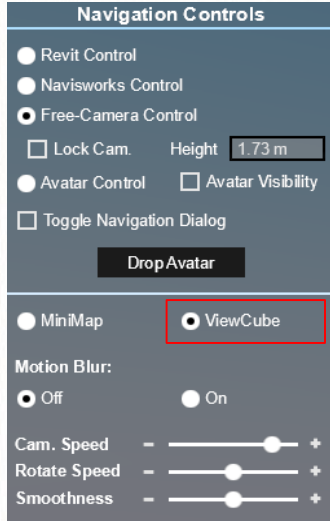
■ 1.7 Navigation



- Navigate
- Select element

1 Introduction

■ 1.7 Navigation



Jump to selected level

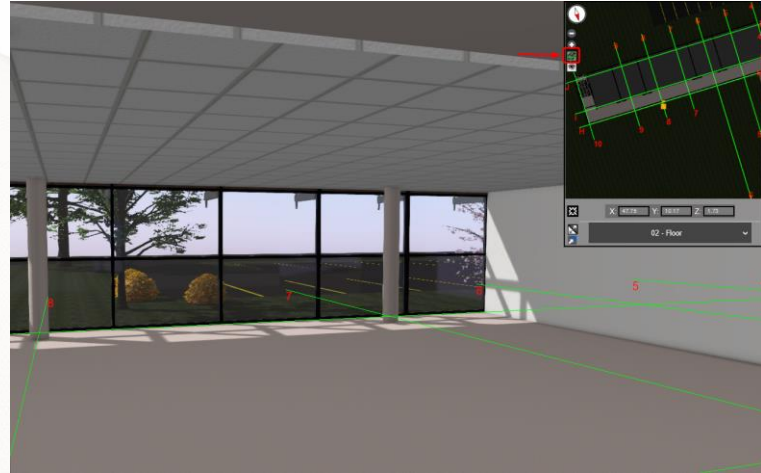
*Move the view angle by
dragging the camera icon
on the MiniMap*

1 Introduction

■ 1.7 Navigation



Trigger Grid in MiniMap



Trigger Grid in Model (Extra click for changing Grid Mode)

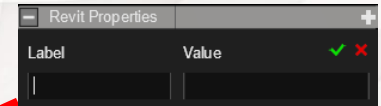
1 Introduction

■ 1.8 Element Properties



Select object to read its properties

Press "Esc" to cancel selection

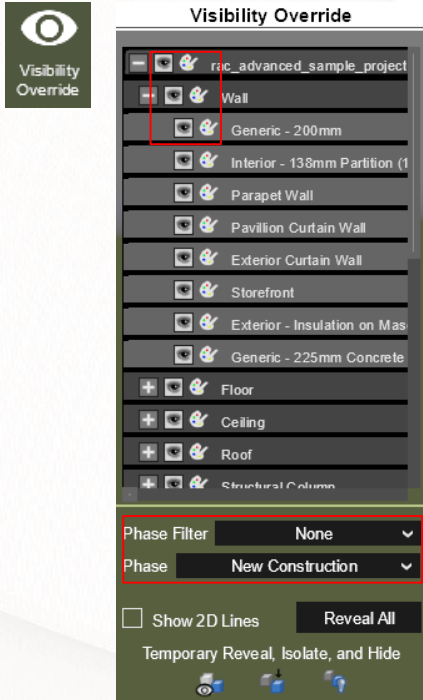


Instance Parameters can be added in the Fuzor for the selected elements. The information can be retrieved in Fuzor, such as Filter by Parameter.

However, these new parameters cannot be sync back to Revit.

1 Introduction

■ 1.9 Visibility Override



Control element's visibility by documents, categories, types, phases

Control element's color override by documents, categories, types

1 Introduction

1.9 Visibility Override



*Select element(s) and click
temporary visibility override*





Temporary Hide - Ctrl + Shift + H
Temporary Isolate - Ctrl + Shift + I
Temporary Reveal - Ctrl + Shift + R

1 Introduction

■ 1.10 Grouping



1. Select multiple target elements
(Pressing "Ctrl" and select)
2. Click , then icon will turn to 
3. After grouping, once you select one
the elements, whole group will be
selected (highlighted)

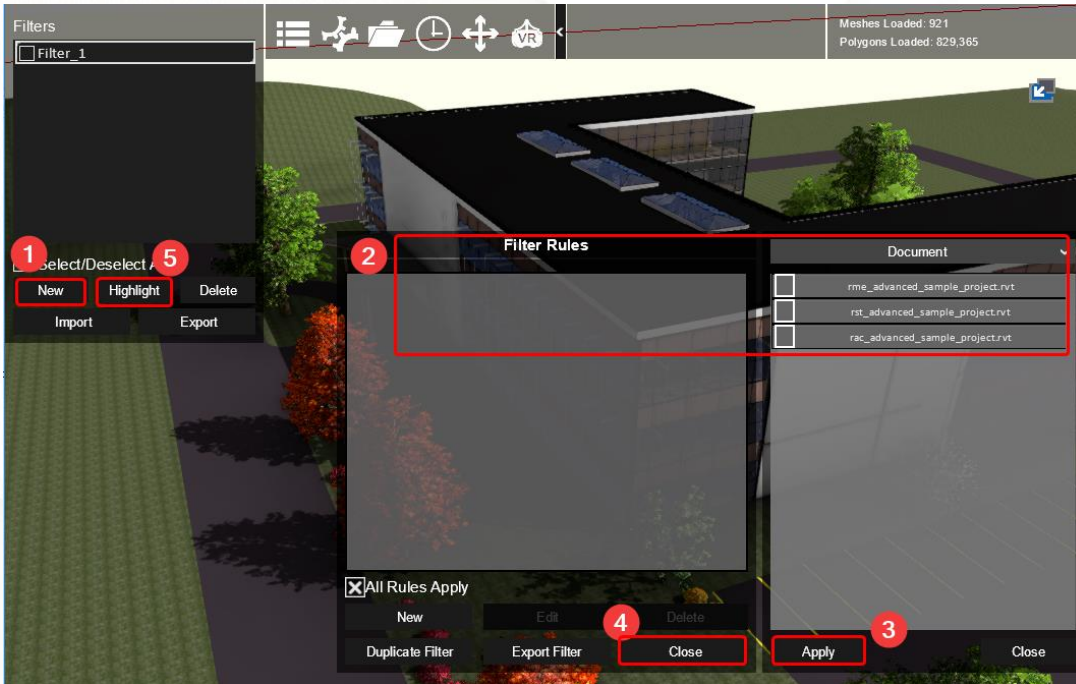
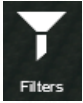
To Ungroup, select the group and

click



1 Introduction

1.10 Filter

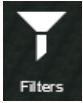


Apply Filter to highlight specific elements

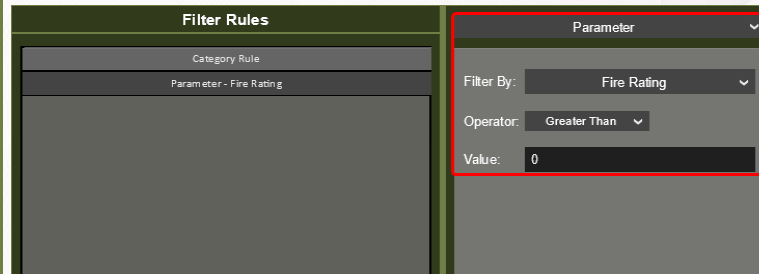
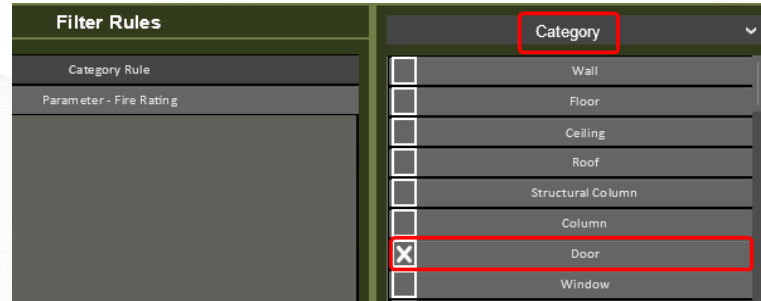
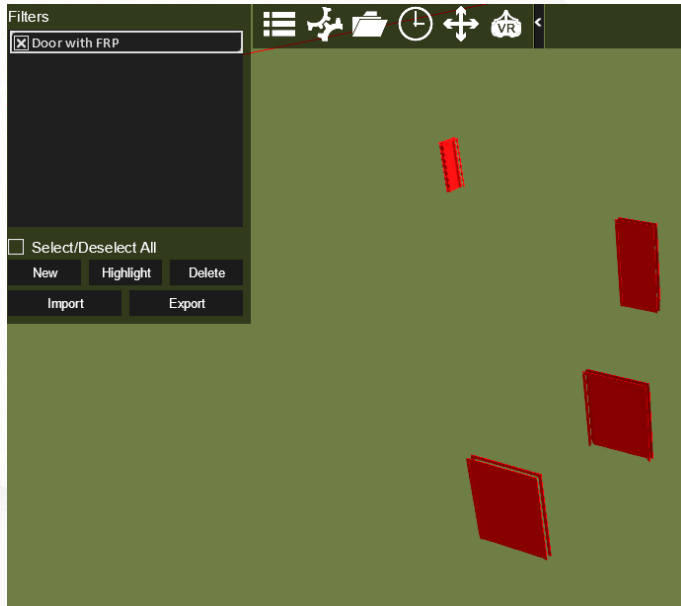
(This may be useful for grouping, color override, construction sequence simulation)

1 Introduction

■ 1.10 Filter

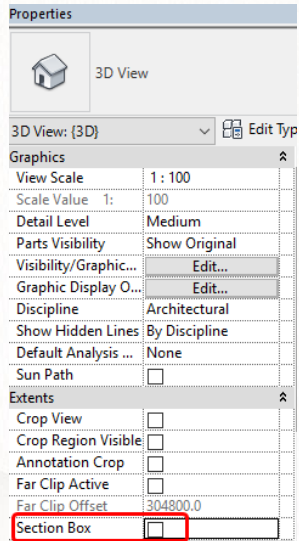


Exercise: Prepare Filter for Door with FRP



1 Introduction

■ 1.11 Sectioning

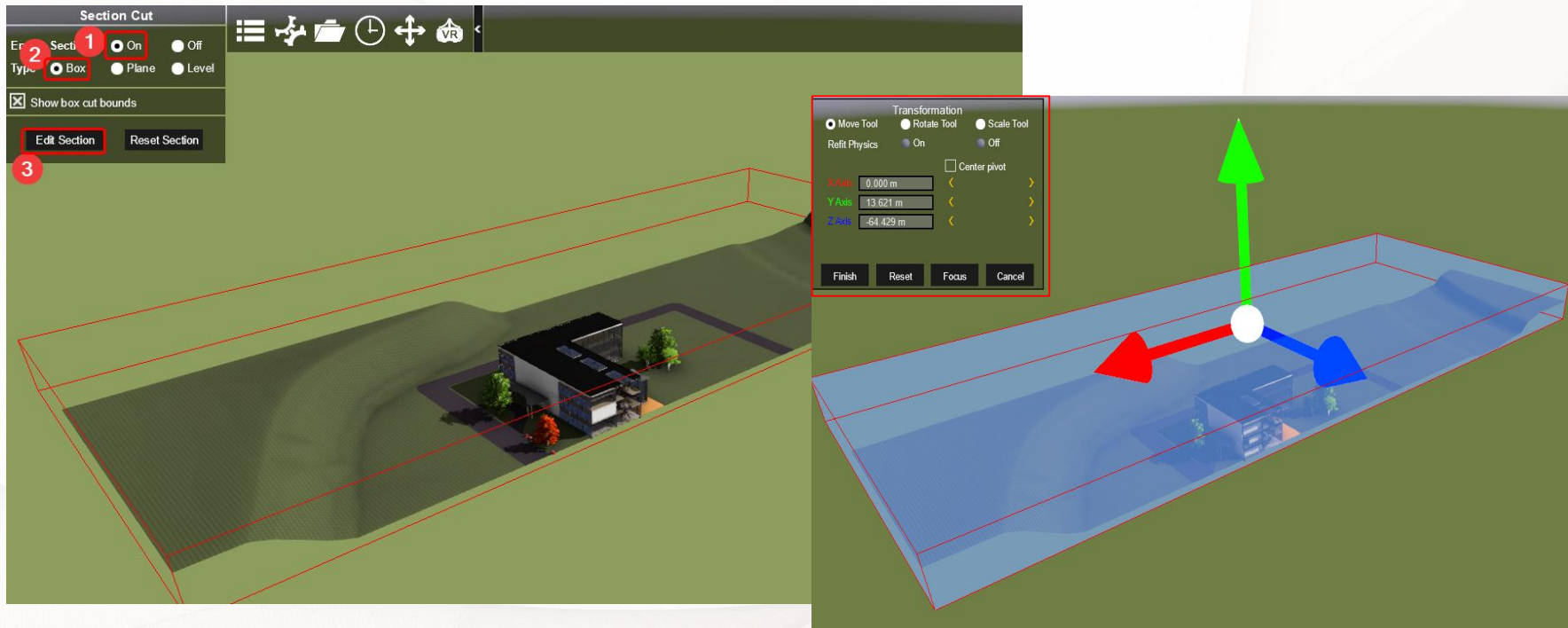


Section Cut in Fuzor

Make sure *Section Box from Revit* is turned *OFF*, unless you want to limit the view in Fuzor

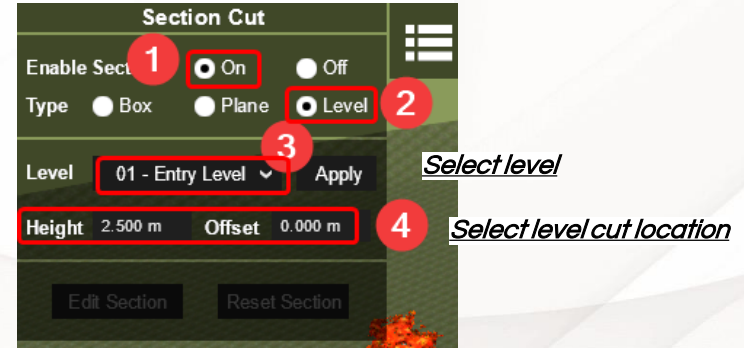
1 Introduction

- 1.11 Sectioning
- Section by Box



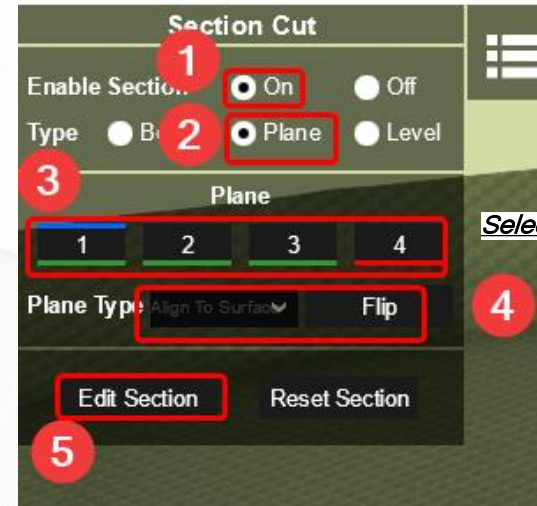
1 Introduction

- 1.11 Sectioning
- Section by Level



1 Introduction

- 1.11 Sectioning
- Section by Plane



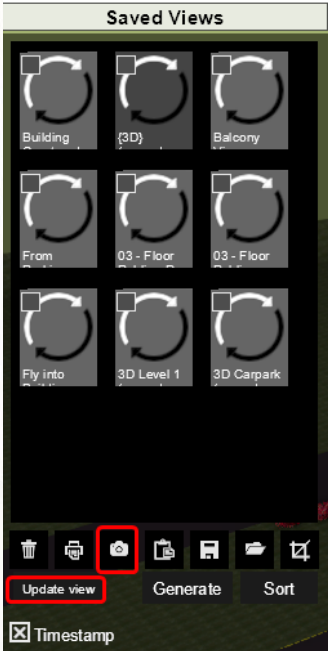
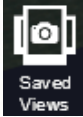
Select Plane number

Choose Plane Type

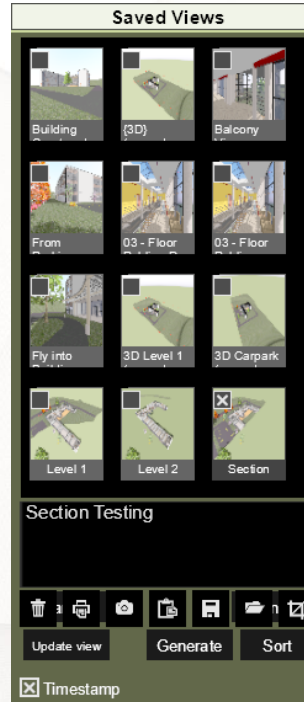
Horizontal
Vertical
Align To Surface

1 Introduction

■ 1.12 Saved Views



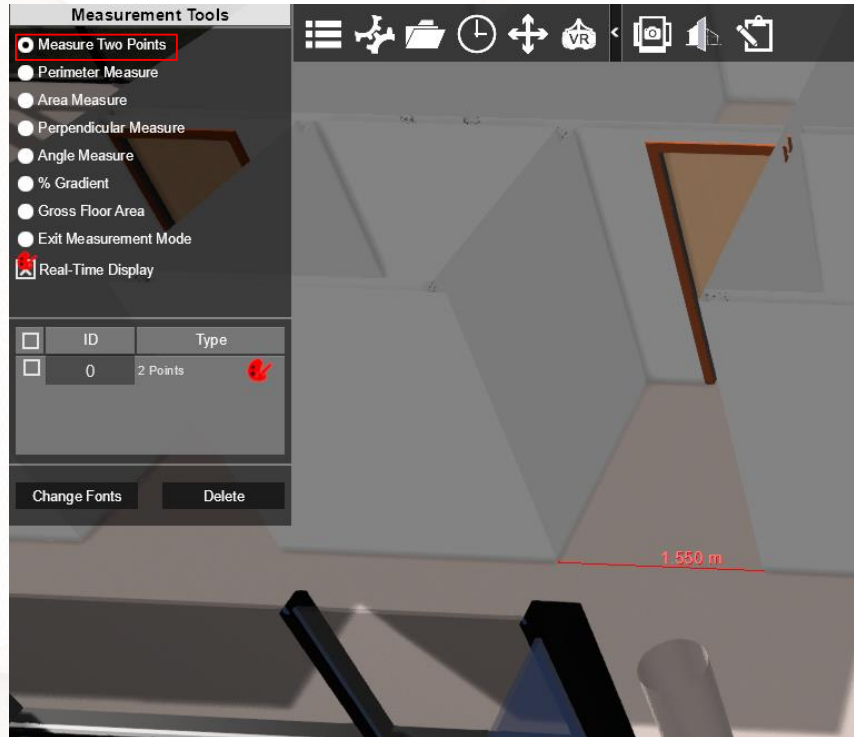
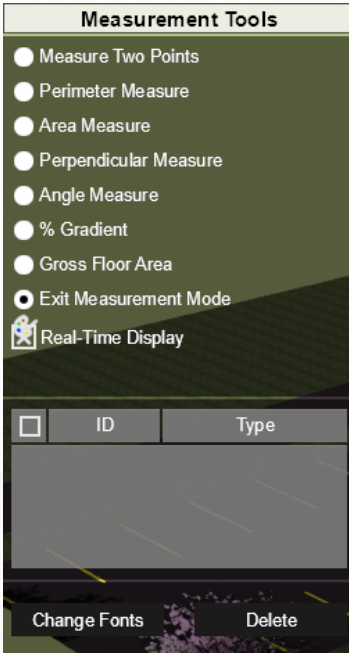
*3D views from Revit
will be synchronized*



*Prepare Level's views and views with
specific sections to facilitate further
project review and collaboration.*

1 Introduction

■ 1.13 Measurement



Measure Two Points
Click 2 desire points for measurement

Perimeter Measure
Click several points, accumulated distance

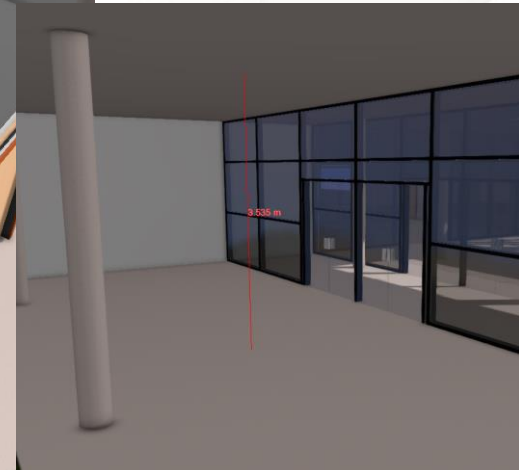
Aera Measure
Click at least 3 points for area measurement

1 Introduction

■ 1.13 Measurement

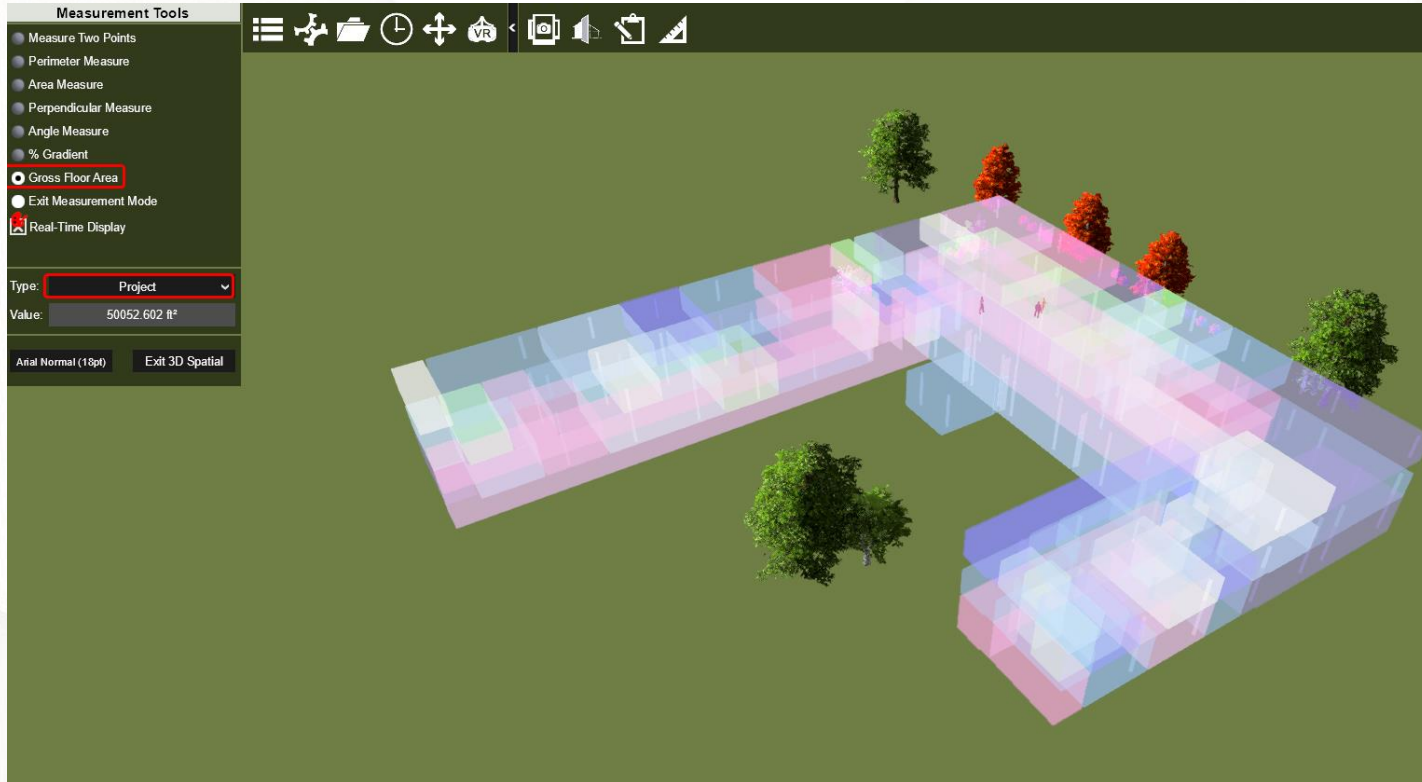


Perpendicular Measure
One click on the target element which
with perpendicular object



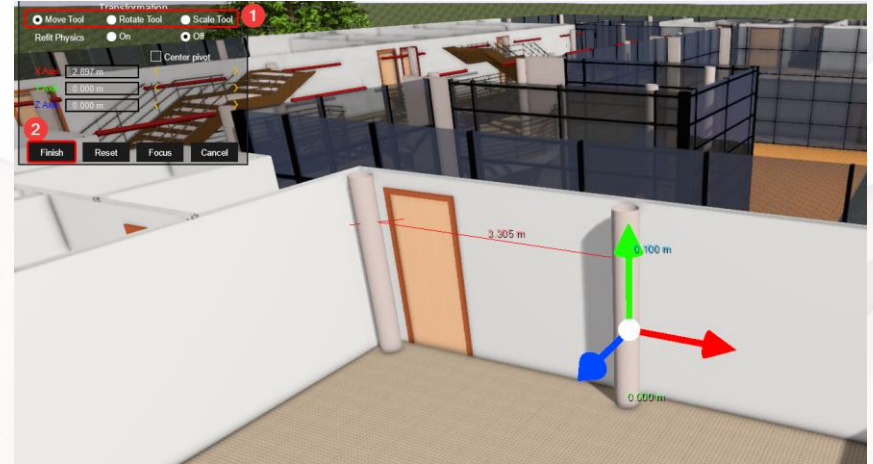
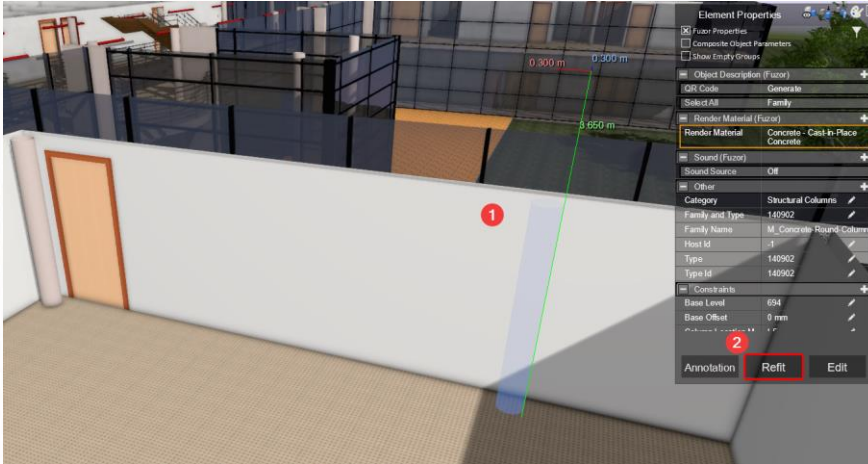
1 Introduction

■ 1.13 Measurement



2 Coordination, BIM analysis

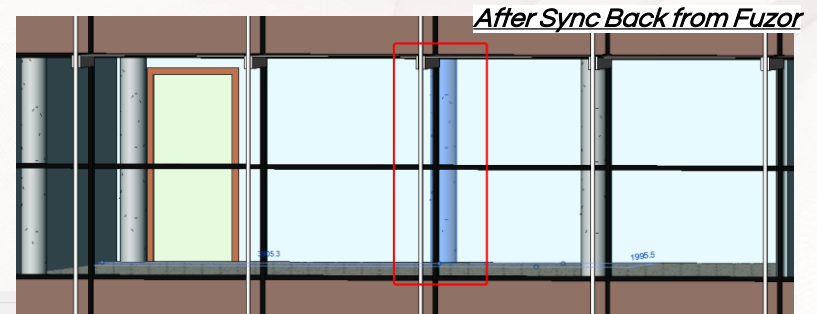
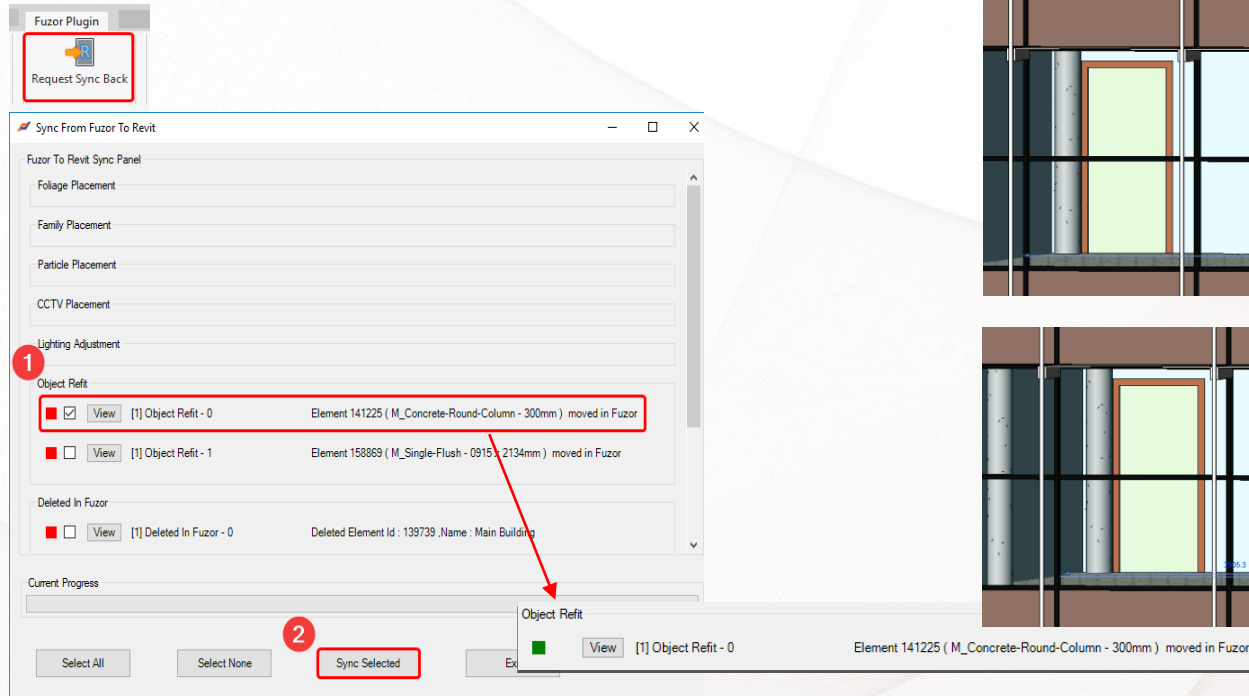
- 2.1 Real-time editing
 - 2.1.1 Move element in Fuzor



2 Coordination, BIM analysis

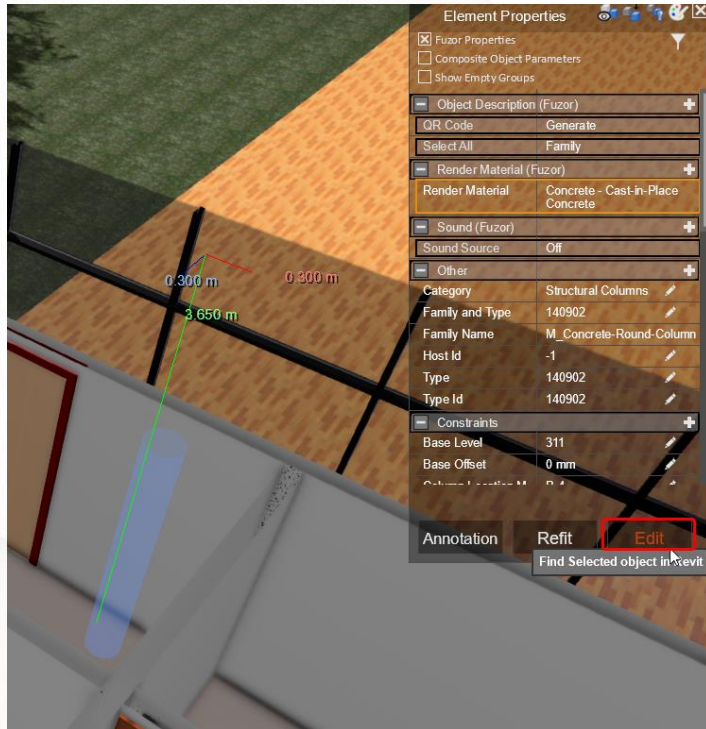
2.1 Real-time editing

2.1.2 Move element in Fuzor Sync Back to Revit [Approval Process]



2 Coordination, BIM analysis

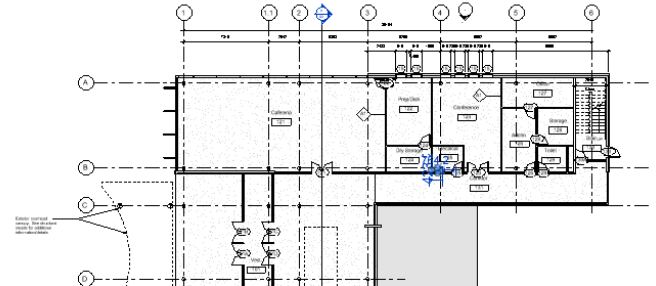
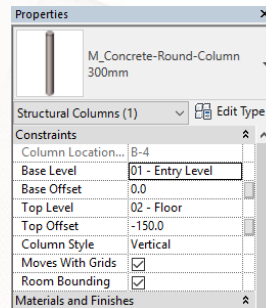
- 2.1 Real-time editing
 - 2.1.3 “Edit” Function in Fuzor



Attention please!!!

“Edit” function in Fuzor means Find selected object in Revit

It brings you to a corresponding floor plan for editing in Revit.



AVOID to click “Edit” if you have customized some elements in Fuzor model which separated from Revit model!!!

2 Coordination, BIM analysis

▪ 2.1 Real-time editing

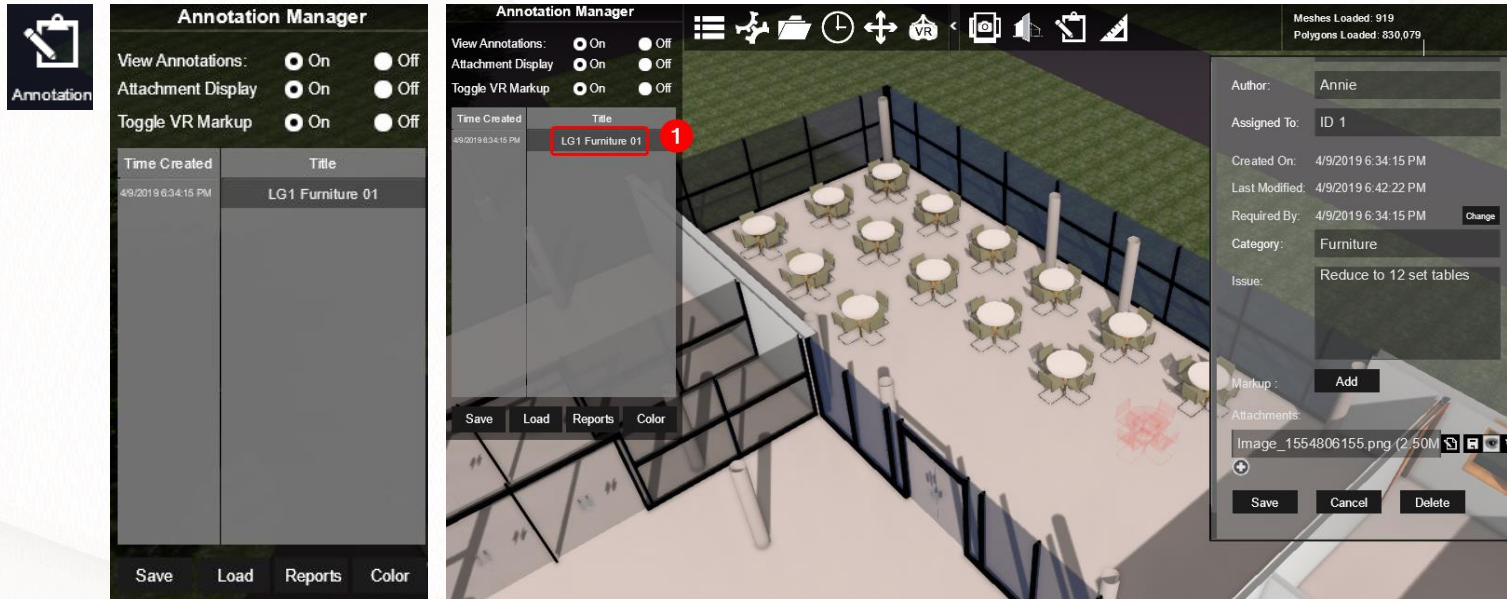
- 2.1.4 Makeup Annotation (Note) in Fuzor



2 Coordination, BIM analysis

■ 2.1 Real-time editing

- 2.1.5 Check Annotation (Note) in Fuzor

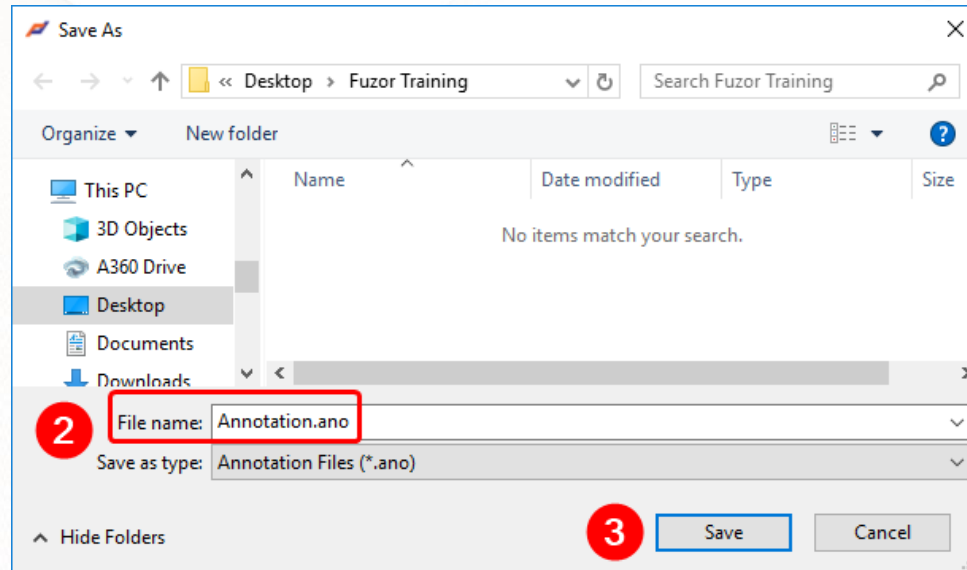
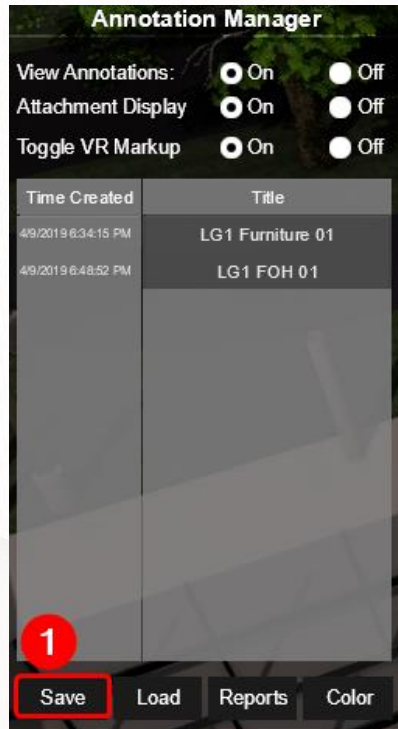


*Click on the Title,
Fuzor will retrieve the
view angle and
Annotation Panel*

2 Coordination, BIM analysis

2.1 Real-time editing

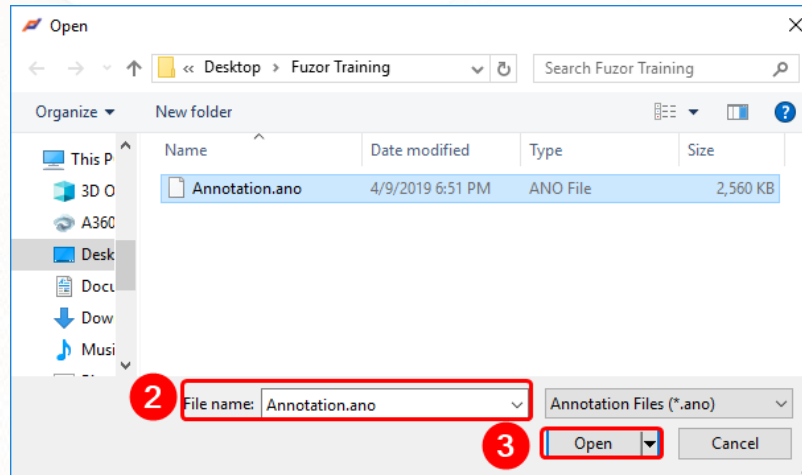
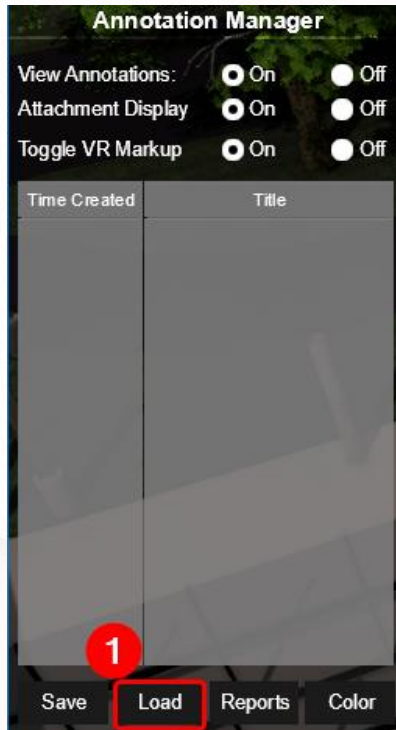
- 2.1.6 Export Annotation (Note)



2 Coordination, BIM analysis

2.1 Real-time editing

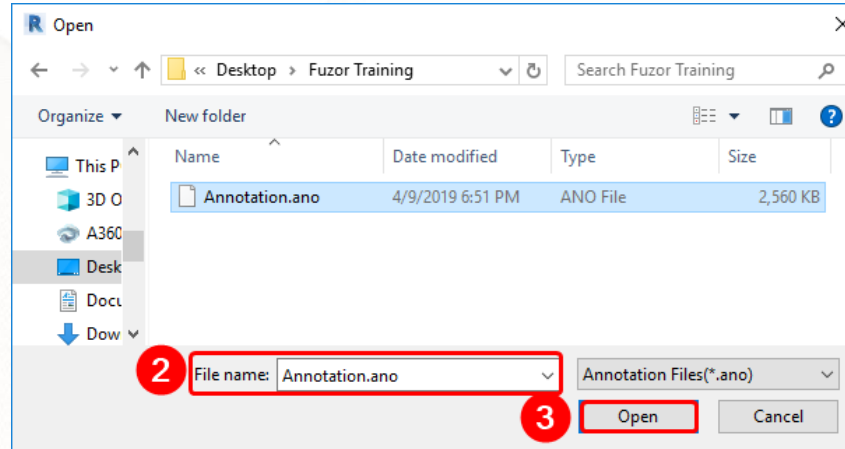
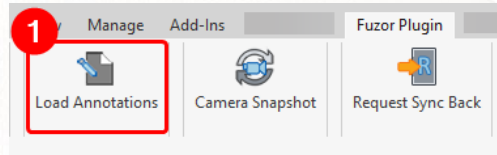
- 2.1.7 Import Annotation (Note)



2 Coordination, BIM analysis

2.1 Real-time editing

- 2.1.8 Check Annotation (Note) in Revit



Fuzor Annotation Manager

	Index	Id	Creator	Assigned To	Title	Level	Due Date	Revit Category	Category	Content	Attachments	Modified Date	Created Date
▶	1	180620	Annie	ID 1	LG1 Furniture 01	01 - Entry Level	4/9/2019 6:34 PM	Furniture	Furniture	Reduce to 12 set tables	1	4/9/2019 6:42 PM	4/9/2019 6:34 PM
	2	196728	Annie	Architect	LG1 FOH 01	01 - Entry Level	4/9/2019 6:48 PM	Doors	FOH Door	Enlarge Door size	0	4/9/2019 6:49 PM	4/9/2019 6:48 PM

Highlight Annotations

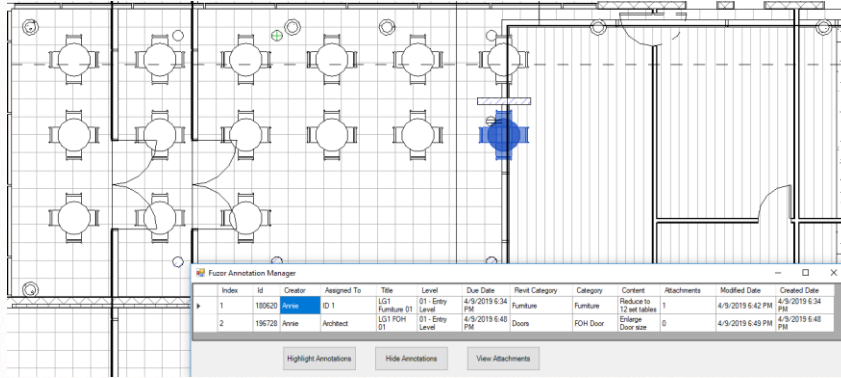
Hide Annotations

View Attachments

2 Coordination, BIM analysis

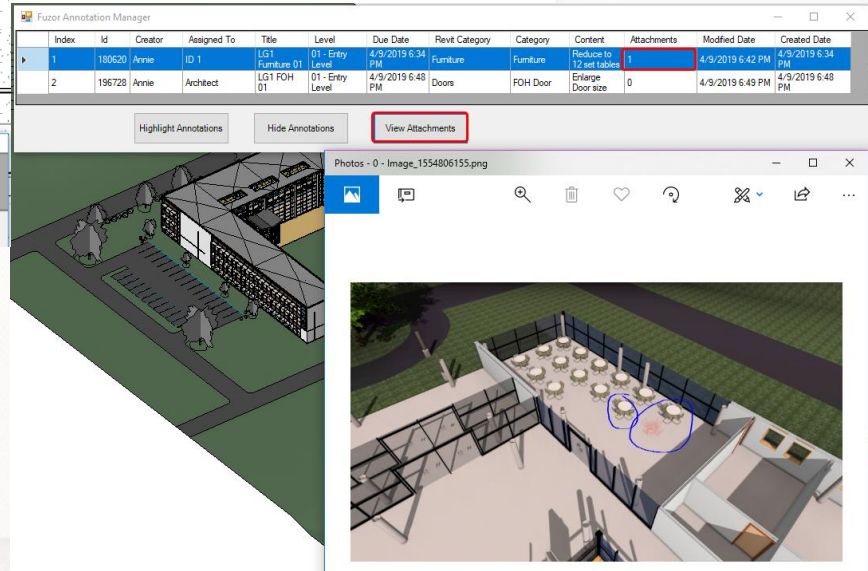
2.1 Real-time editing

2.1.8 Check Annotation (Note) in Revit



Double clicking the issue to retrieve corresponding floor plan

Click "View Attachment" to review the markup or other supporting documents



2 Coordination, BIM analysis

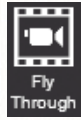
■ 2.1 Real-time editing

- Move element in Fuzor (Sync Back to Revit afterwards)
 - Highlight the element in Fuzor and Revit
 - Delete elements in Fuzor (Sync Back to Revit afterwards)
 - Place/ Add elements from existing loadable family in Fuzor (Sync Back to Revit afterwards)
-
- X Modify the element's Parameter
 - X Change the element's Family/ Type
 - X Sync Back Fuzor 's components (except Tree Foliage) to Revit

2 Coordination, BIM analysis

2.2 Create video

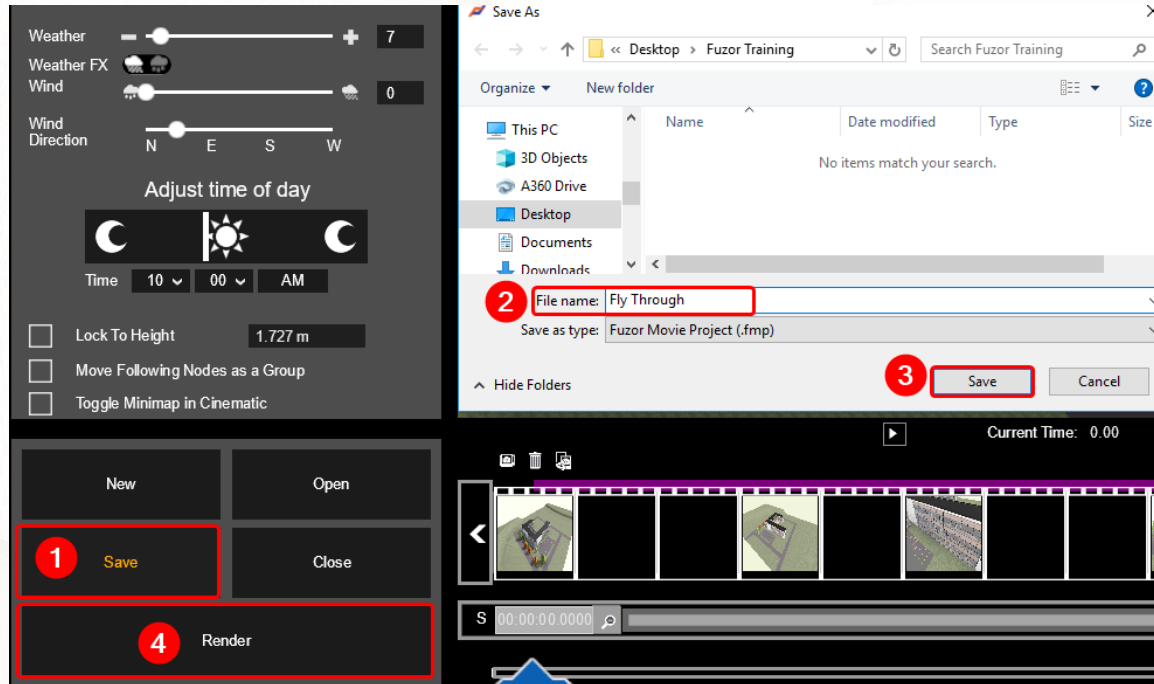
- 2.2.1 Fly Through Video



2 Coordination, BIM analysis

■ 2.2 Create video

- 2.2.1 Fly Through Video



2 Coordination, BIM analysis

2.2 Create video

- 2.2.2 Walk Through Video

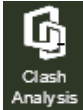


1: Play Walk Through Video in Fuzor
2: Export Walk Through Video in MP4 format



2 Coordination, BIM analysis

2.3 Clash Analysis



2.3.1 Run Clash Analysis

Clash Analysis

User Information

Username:

Client Name:

NewProject_1 - 4/23/2019 7:16:07 PM

Name:

1 Run All Tests

New Delete

Save Load

Selection 1

- ☐ rme_advanced_sample_project.rvt
- ☐ Roof Level
- ☐ Level 2
- ☐ Level 3
- ☐ Unnamed Level
- ☐ Level 1

Selection 2

- ☐ rme_advanced_sample_project.rvt

Results

Report	Clash Name	View	Stage	Level	Grid Intersection	Assigned To	Priority	Due
<input checked="" type="checkbox"/>	NewClash_1		New	Level 1	B - 5	None	Low	4/30/20
<input checked="" type="checkbox"/>	NewClash_2		New	Level 1	B - 4	None	Low	4/30/20
<input checked="" type="checkbox"/>	NewClash_3		New	Level 1	B - 5	None	Low	4/30/20
<input checked="" type="checkbox"/>	NewClash_4		New	Level 1	B - 5	None	Low	4/30/20
<input checked="" type="checkbox"/>	NewClash_5		New	Level 1	B - 5	None	Low	4/30/20
<input checked="" type="checkbox"/>	NewClash_6		New	Level 1	B - 4	None	Low	4/30/20
<input checked="" type="checkbox"/>	NewClash_7		New	Level 1	B - 5	None	Low	4/30/20

3 Run Test End Test Transparency Tolerance: 0.0010000000 m Total Clashes: 0 New: 0 Active: 0 Resolved: 0

4 Clashes: 159 New: 159 Active: 0 Resolved: 0

5 Report Reset Levels

6 OK

Total Clashes: 159
New Clashes: 159

2 Coordination, BIM analysis

2.3 Clash Analysis

- 2.3.2 Assignment of Clash Analysis

Report	Clash Name	View	Stage	Level	Grid Intersection	Assigned To	Priority	Due Date	Assigner	Date Modified	Description
<input checked="" type="checkbox"/>	NewClash_80		New	Level 2	C - 1.1	None	Low	4/30/2019 5:00:00 PM		4/23/2019 7:20:38 PM	
<input checked="" type="checkbox"/>	NewClash_2		Active	Level 1	B - 4	None	Low	4/30/2019 5:00:00 PM		4/23/2019 7:22:23 PM	
<input checked="" type="checkbox"/>	NewClash_3		Active	Level 1	B - 5	None	Low	4/30/2019 5:00:00 PM		4/23/2019 7:22:35 PM	
<input checked="" type="checkbox"/>	NewClash_4		New	Level 1	B - 5	None	Low	4/30/2019 5:00:00 PM		4/23/2019 7:20:38 PM	
<input checked="" type="checkbox"/>	NewClash_5		New	Level 1	B - 5	None	Low	4/30/2019 5:00:00 PM		4/23/2019 7:20:38 PM	
<input checked="" type="checkbox"/>	NewClash_6		New	Level 1	B - 4	None	Low	4/30/2019 5:00:00 PM		4/23/2019 7:20:38 PM	
<input checked="" type="checkbox"/>	NewClash_7		New	Level 1	B - 5	None	Low	4/30/2019 5:00:00 PM		4/23/2019 7:20:38 PM	
<input checked="" type="checkbox"/>	NewClash_8		New	Level 1	B - 4	None	Low	4/30/2019 5:00:00 PM		4/23/2019 7:20:38 PM	
<input checked="" type="checkbox"/>	NewClash_9		New	Level 1	A - 5	None	Low	4/30/2019 5:00:00 PM		4/23/2019 7:20:38 PM	
<input checked="" type="checkbox"/>	NewClash_10		New	Level 1	B - 3	None	Low	4/30/2019 5:00:00 PM		4/23/2019 7:20:38 PM	
<input checked="" type="checkbox"/>	NewClash_11		New	Level 1	C - 1.1	None	Low	4/30/2019 5:00:00 PM		4/23/2019 7:20:38 PM	

Total Clashes: 159 New: 157 Active: 2 Resolved: 0

142427 (ID:392170) MW 11.5 (ID:573604)

Isolate Highlight

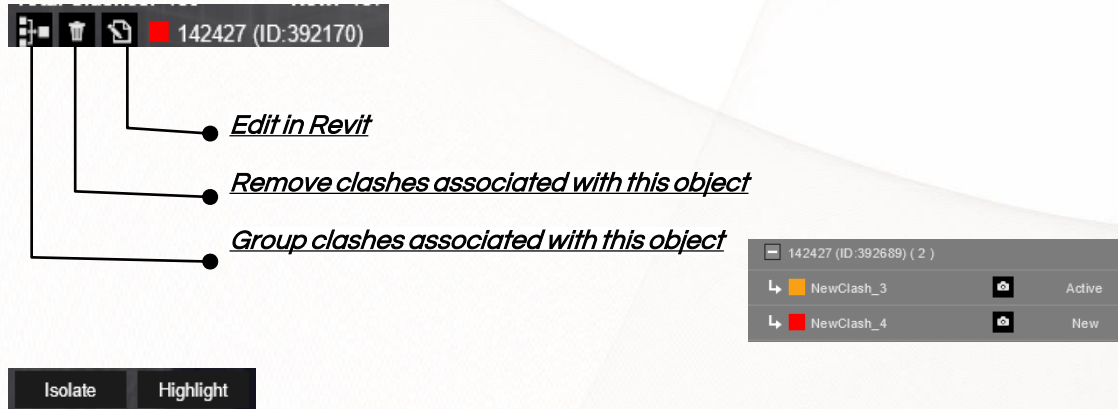
By clicking the issue, users can review the clashes, assign the person-in-charge, priority and description.

By clicking the tab to sort the issues according to corresponding heading.

2 Coordination, BIM analysis

▪ 2.3 Clash Analysis

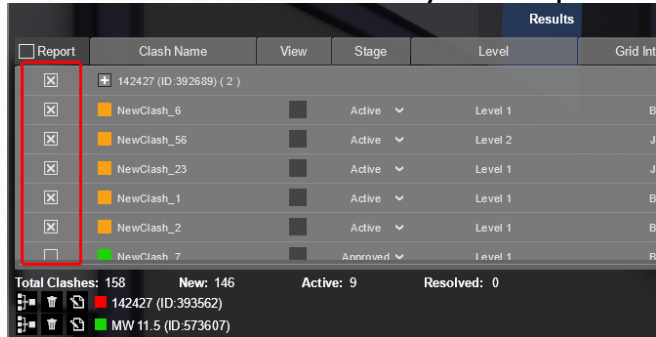
- 2.3.2 Assignment of Clash Analysis



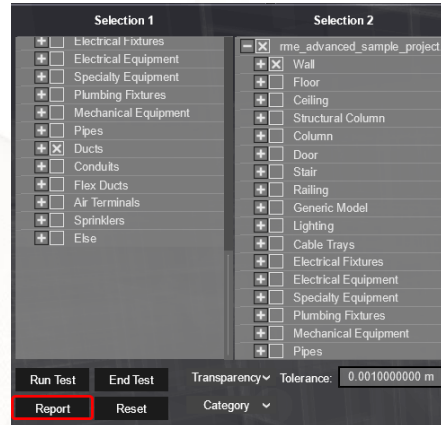
2 Coordination, BIM analysis

2.3 Clash Analysis

- 2.3.3 Clash Analysis Report



Select the clash entries to be reported



Generate Clash Analysis Report



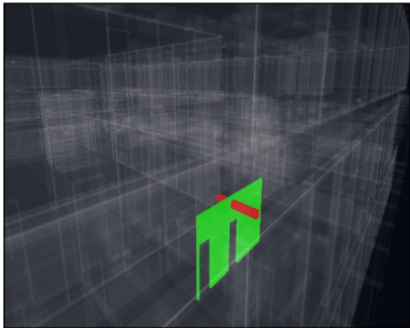
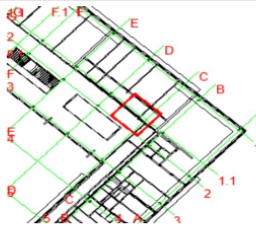
*Double confirm the reported clash entries
Select the report format and presentation settings*

2 Coordination, BIM analysis

2.3 Clash Analysis

2.3.3 Clash Analysis Report

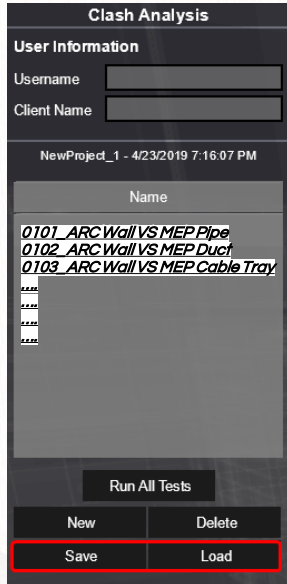
Clash Report
4/23/2019

Clash ID No.	001	Priority/Severity	Low	
Stage	New	Location Floor		
Clash Tolerance	0.001 m	Location Grid line	C - 1.1	
Clash Magnitude / Depth		Clash Point	X: 7.51m, Y: 40.47m, Z: 6.77m	
Date Found (MM/DD/YYYY)	4/23/2019	Remark		
Description		Key Responsible Party		
3D View		Location Map		
				
		BIM Advice		
Party	Feedback Resolution	Title	Signatory	Date of Signature
Design Consultant				
Client Project Team				

2 Coordination, BIM analysis

■ 2.3 Clash Analysis

- 2.3.4 Clash Analysis Test Files



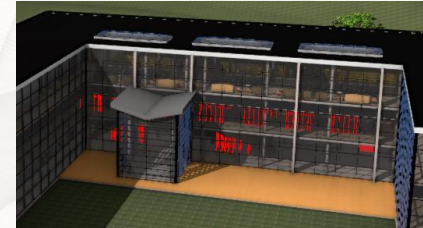
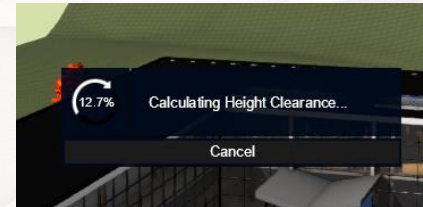
The screenshot shows the 'Clash Analysis' software interface. At the top, it says 'Clash Analysis'. Below that is a 'User Information' section with fields for 'Username' and 'Client Name'. A status bar indicates 'NewProject_1 - 4/23/2019 7:16:07 PM'. The main area is titled 'Name' and contains a list of test files: '0101_ARC Wall VS MEP Pipe', '0102_ARC Wall VS MEP Duct', and '0103_ARC Wall VS MEP Cable Tray'. Below the list is a 'Run All Tests' button. At the bottom, there are four buttons: 'New', 'Delete', 'Save', and 'Load'. The 'Save' and 'Load' buttons are highlighted with a red rectangular border.

- Clash analysis test files (Project-based) can be exported and imported.
- Test files can be exchanged within project team instead of sending the entire fuzor model with clash analysis.

2 Coordination, BIM analysis

▪ 2.4 Height Clearance

- 2.4.1 Height Clearance for all Rooms in the project



2 Coordination, BIM analysis

■ 2.4 Height Clearance

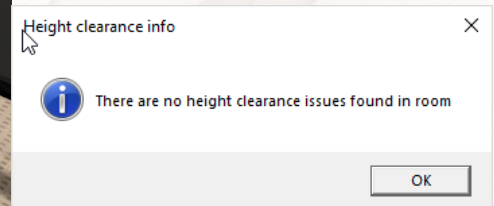
- 2.4.1 Height Clearance for all Rooms in the project



2 Coordination, BIM analysis

■ 2.4 Height Clearance

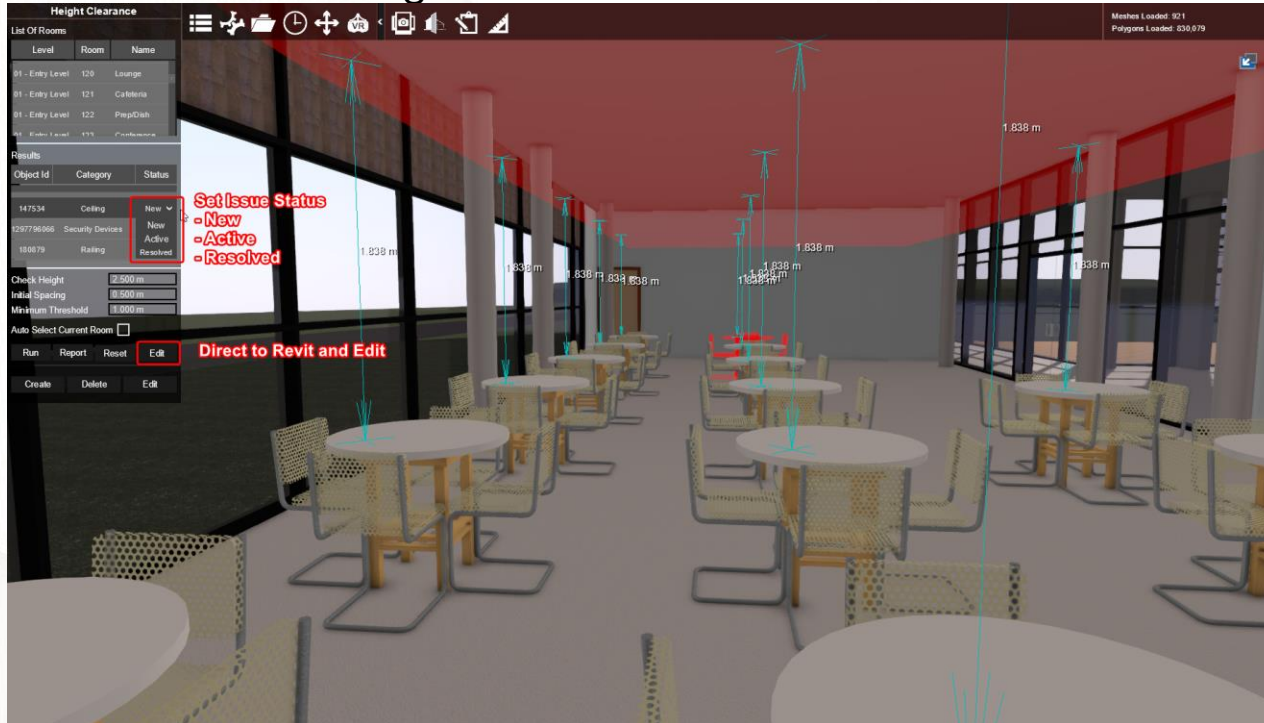
- 2.4.2 Height Clearance for selected room in the project



2 Coordination, BIM analysis

■ 2.4 Height Clearance

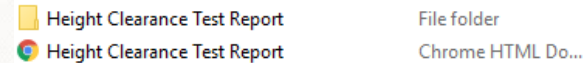
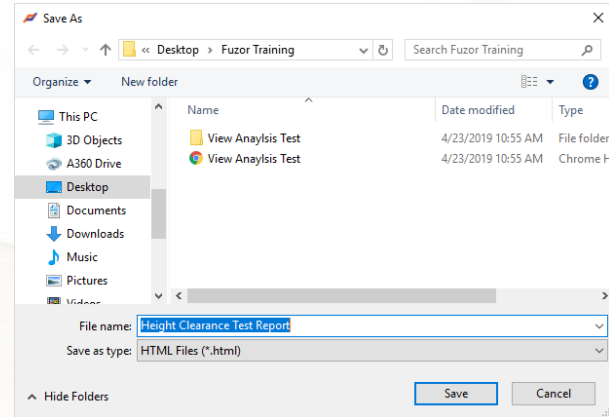
- 2.4.3 Issue assignment



2 Coordination, BIM analysis

■ 2.4 Height Clearance

- 2.4.3 Height Clearance Report



2 Coordination, BIM analysis

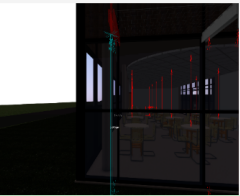
■ 2.4 Height Clearance

- 2.4.3 Height Clearance Report

Fuzor Height Clearance Report

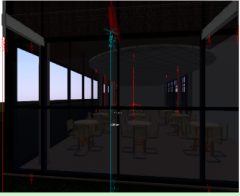
File | C:/Users/Annie/Desktop/Fuzor%20Training/Height%20Clearance%20Test%20Report.html

Fuzor Clearance Report Batch



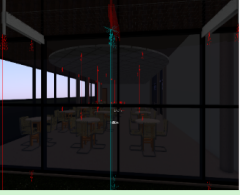
Element ID	200924
Category	Generic Model
Family	SHADE SUPPORT
Symbol	SHADE SUPPORT
Type	200511
Level	311

Number of Potential Hazards : 4
Average Clearance : 2.316 m
Minimum Clearance : 2.277 m



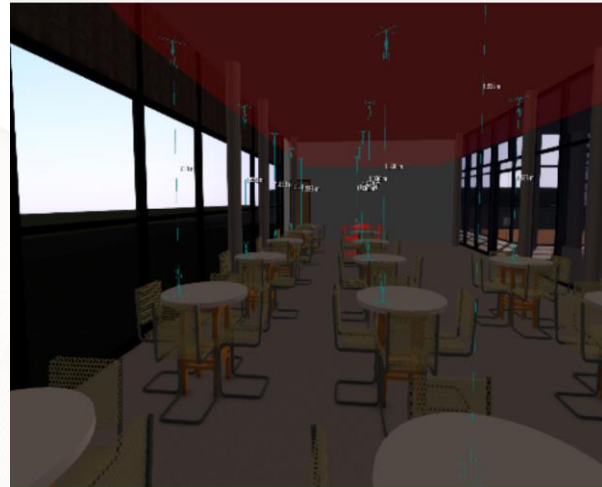
Element ID	200922
Category	Generic Model
Family	SHADE SUPPORT
Symbol	SHADE SUPPORT
Type	200511
Level	311

Number of Potential Hazards : 4
Average Clearance : 2.319 m
Minimum Clearance : 2.280 m



Element ID	200906
Category	Generic Model
Family	SHADE SUPPORT
Symbol	SHADE SUPPORT
Type	200511
Level	311

Number of Potential Hazards : 4
Average Clearance : 2.322 m
Minimum Clearance : 2.283 m



Element ID	147534
Category	Ceiling
Family	19848
Type	600 x 600mm Grid
Level	01 - Entry Level

Number of Potential Hazards : 14
Average Clearance : 1.838 m
Minimum Clearance : 1.838 m

2 Coordination, BIM analysis

■ 2.5 View Analysis

- 2.5.1 Turn on View Analysis of objects



2 Coordination, BIM analysis

■ 2.5 View Analysis

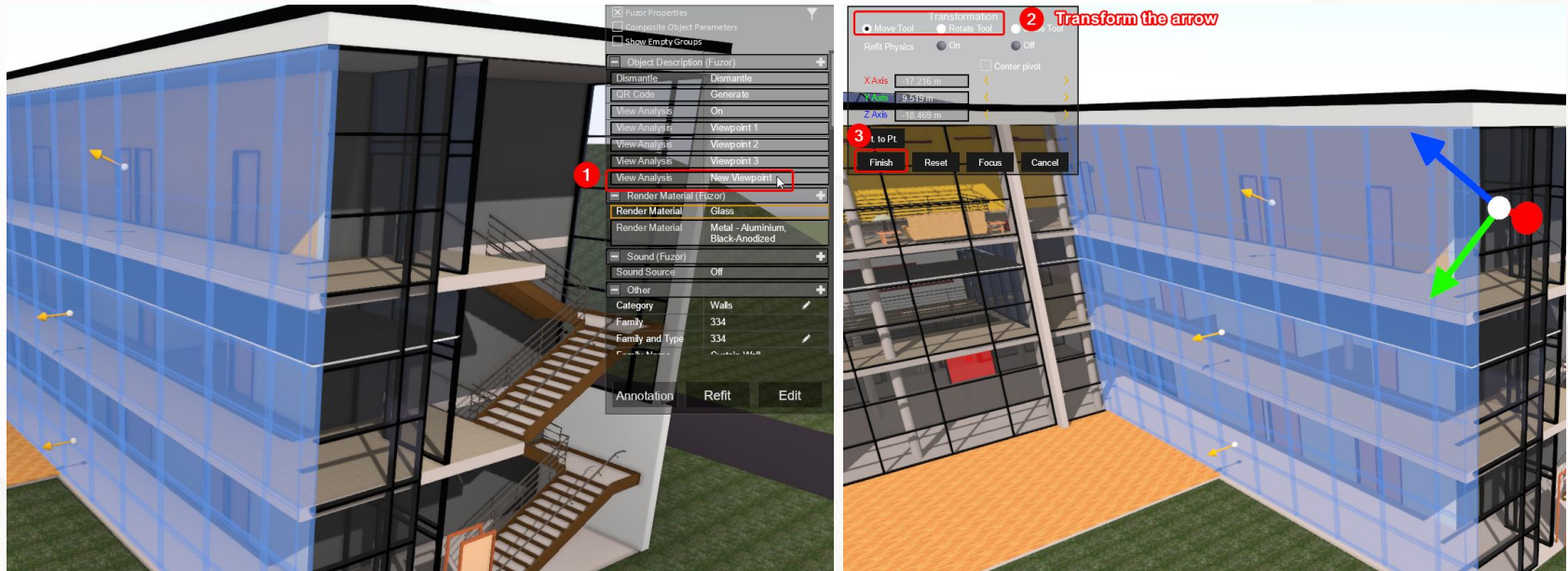
- 2.5.2 Modify View Analysis Viewpoint/ Arrow



2 Coordination, BIM analysis

■ 2.5 View Analysis

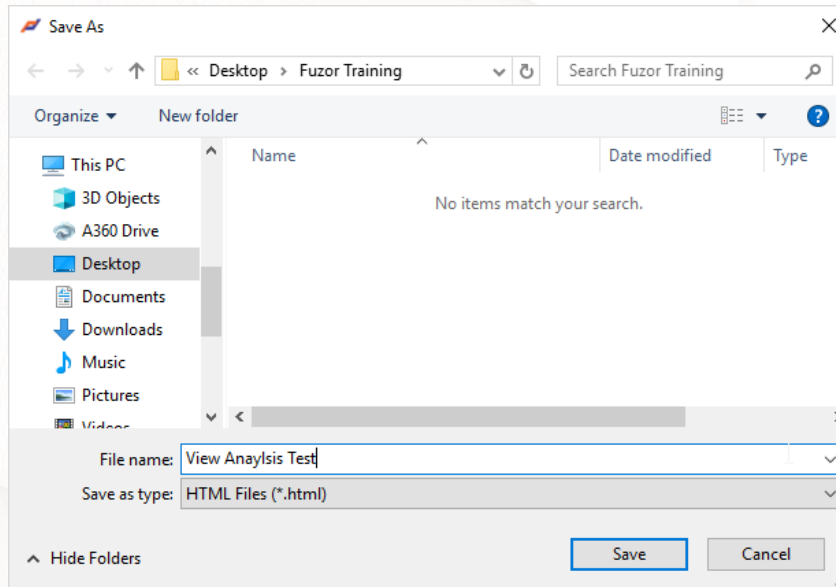
- 2.5.3 Add Extra View Analysis Viewpoint/ Arrow



2 Coordination, BIM analysis

■ 2.5 View Analysis

- 2.5.4 Export View Analysis Report

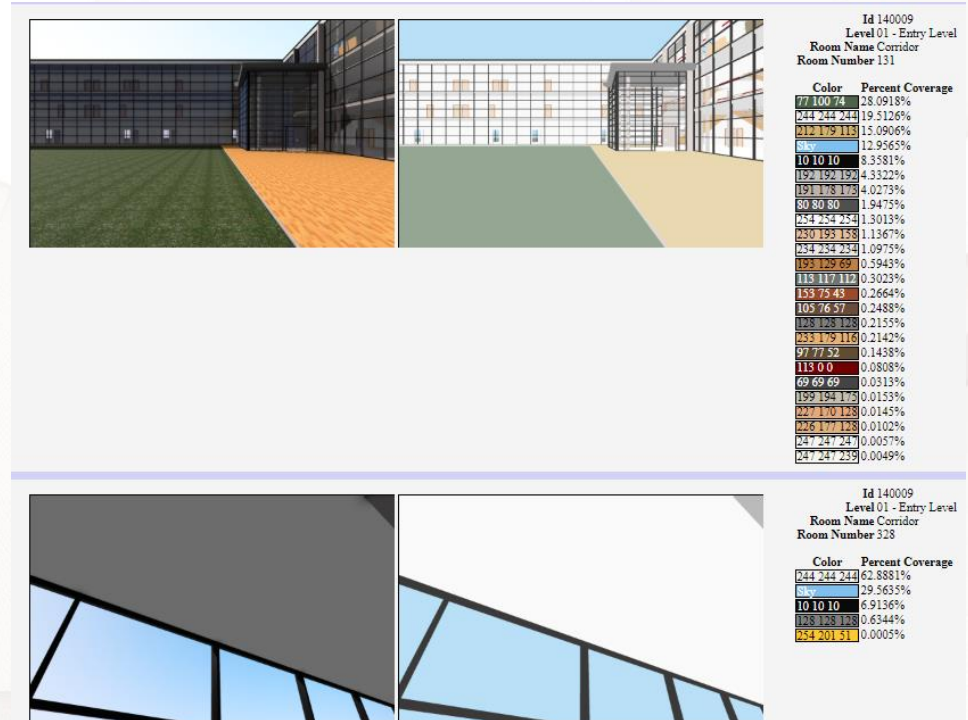
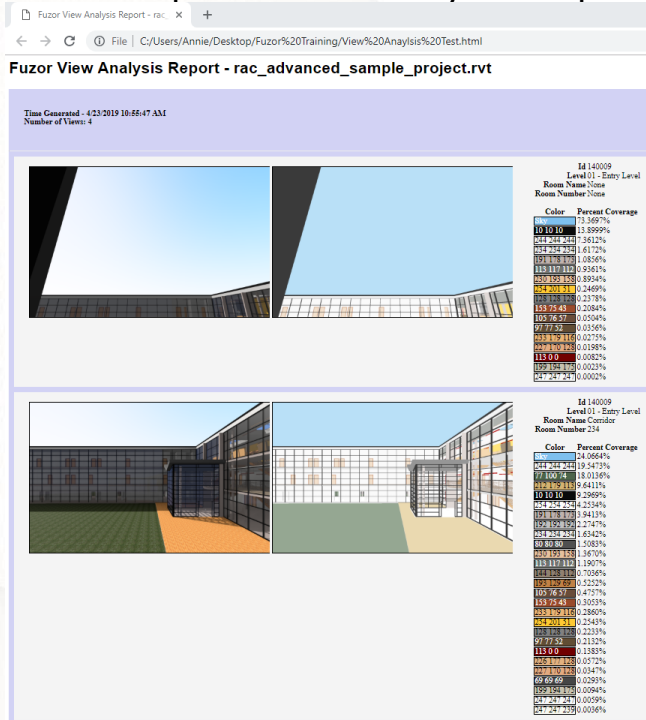


Name	Type
View Analysis Test	File folder
View Analysis Test	Microsoft Excel Comma Separated ...
View Analysis Test	Chrome HTML Document

2 Coordination, BIM analysis

2.5 View Analysis

2.5.4 Export View Analysis Report



2 Coordination, BIM analysis

■ 2.6 Landscape Design

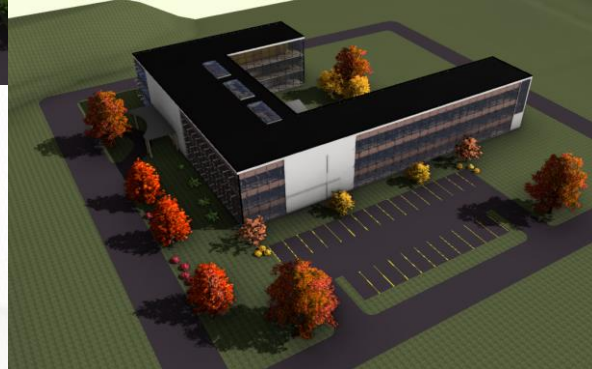


- Fuzor's Foliage library provides over 200 species of trees (Free)
- Trees placements in Fuzor can be synchronized back to Revit for project use.
- Fuzor's Foliage is seasonal where applicable, allowing you to change between Spring, Summer, Fall and Winter coverage, and all of our plant life is animated, reacting with your set wind conditions.
- There are fast placement functions for landscape design.
- Regional contents for foliage and tree growth functions are available for purchase.

2 Coordination, BIM analysis

■ 2.6 Landscape Design

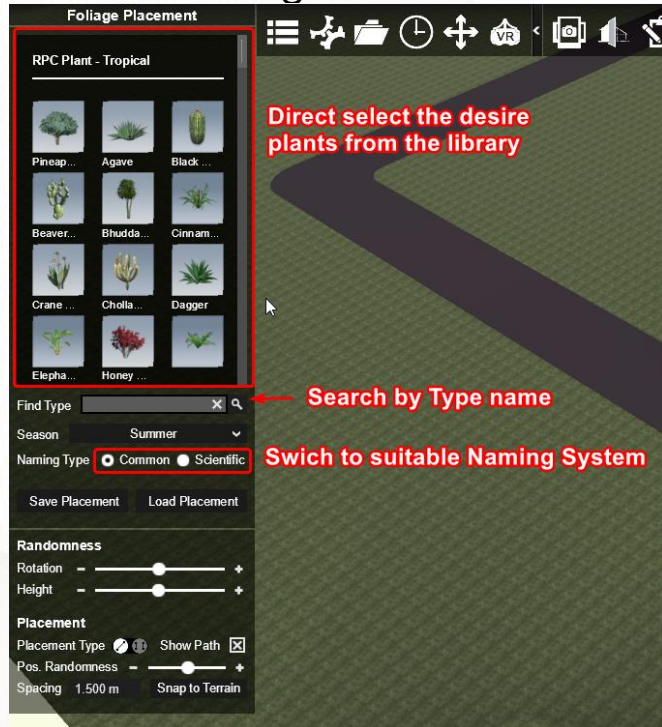
- 2.6.1 Seasonal Preview



2 Coordination, BIM analysis

2.6 Landscape Design

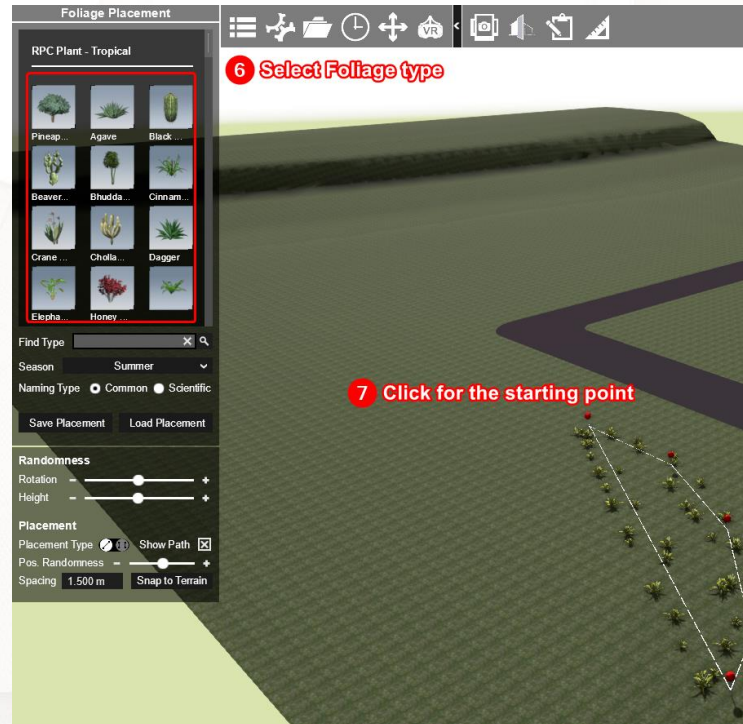
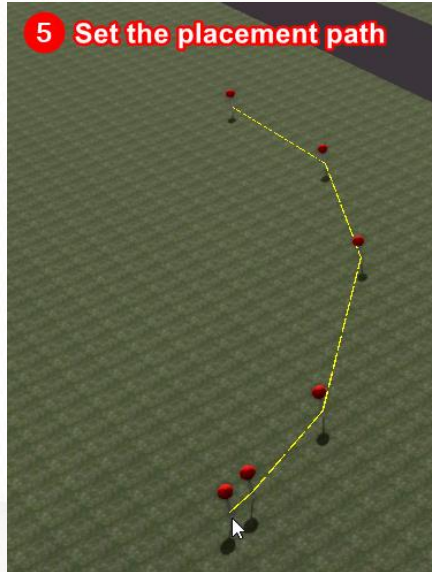
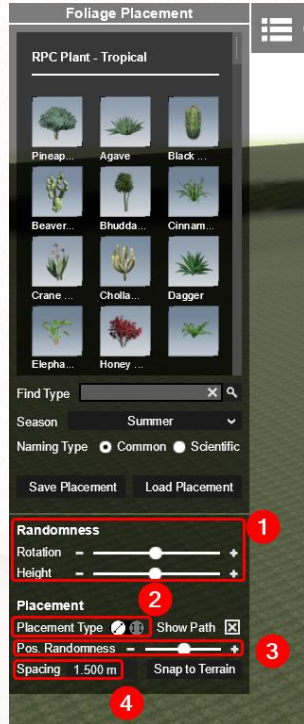
- 2.6.2 Single Placement



2 Coordination, BIM analysis

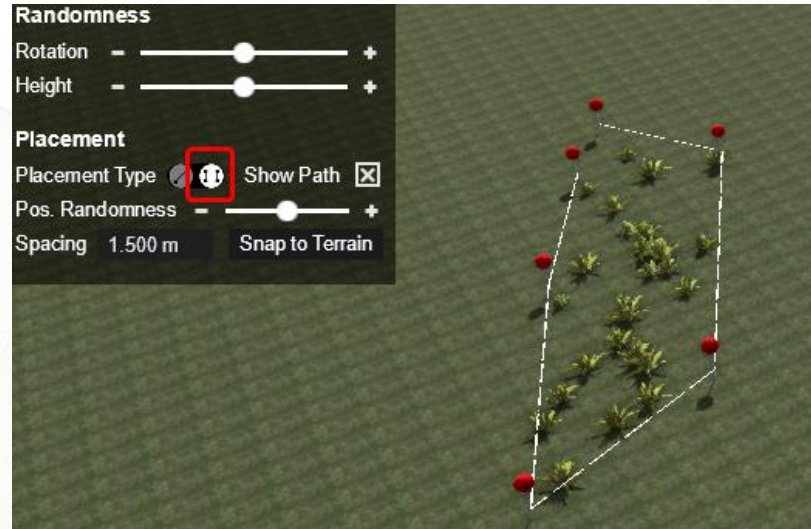
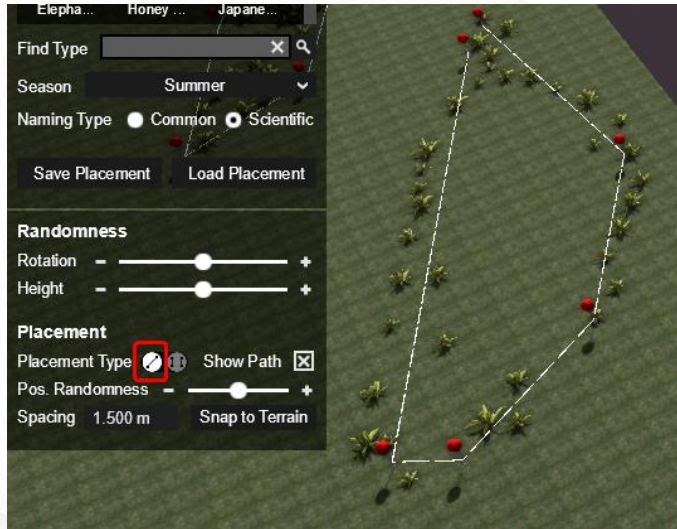
■ 2.6 Landscape Design

- 2.6.2 Batch Placement



2 Coordination, BIM analysis

- 2.6 Landscape Design
 - 2.6.2 Batch Placement

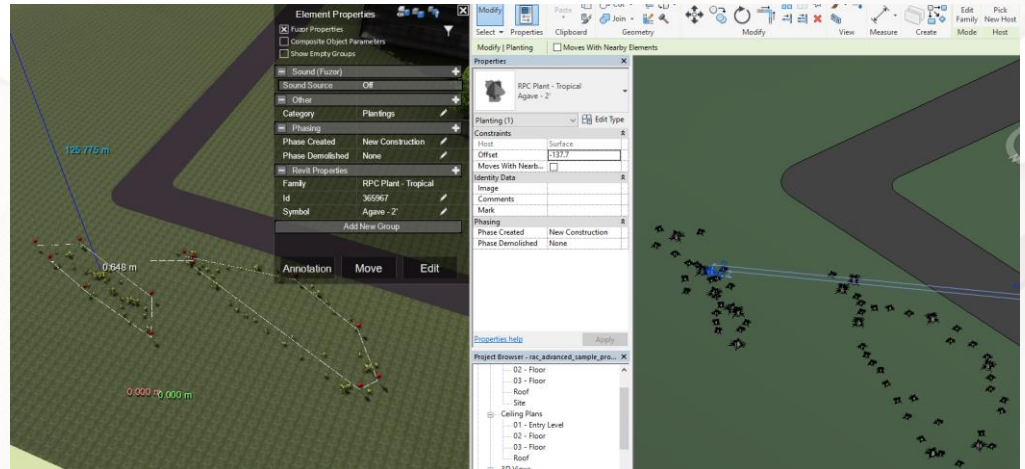
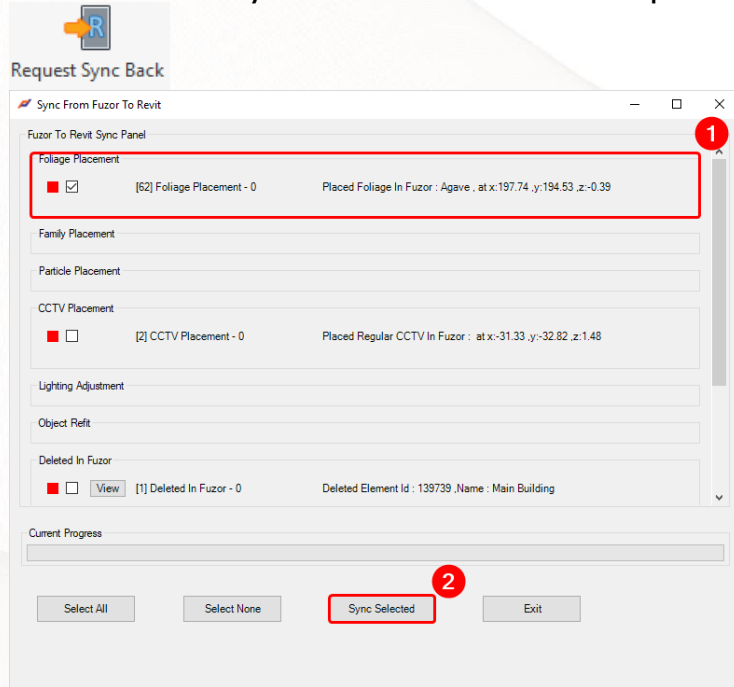


After setting for the placement path, press "Esc" and click again for "Placement Type" for preparing a new path.

2 Coordination, BIM analysis

■ 2.6 Landscape Design

- 2.6.3 Sync Back to Revit Project



2 Coordination, BIM analysis

■ 2.6 Landscape Design

- 2.6.4 Tree Growth



"Tree Growth" function is only available for purchase version.

2 Coordination, BIM analysis

- 2.6 Landscape Design
 - 2.6.4 Tree Growth



2 Coordination, BIM analysis

■ 2.6 Landscape Design

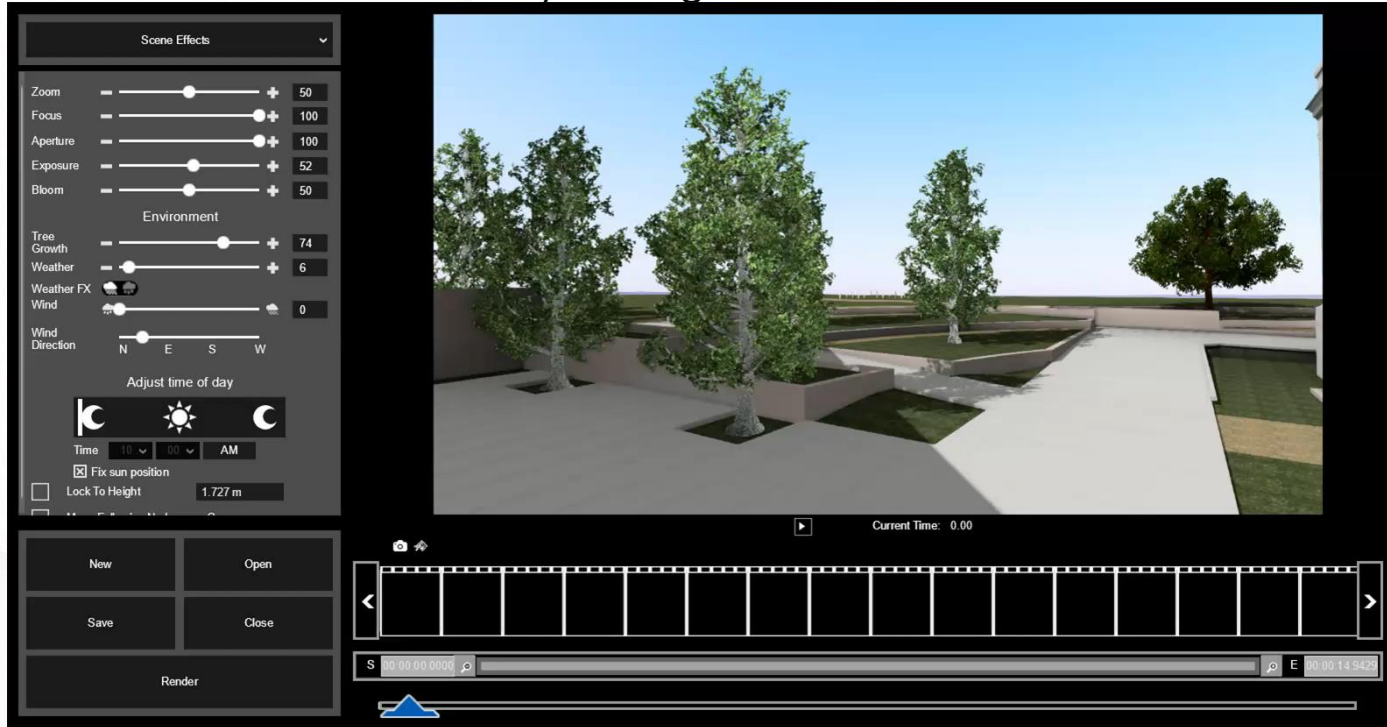
- 2.6.5 Tree Growth in Fly Through



2 Coordination, BIM analysis

■ 2.6 Landscape Design

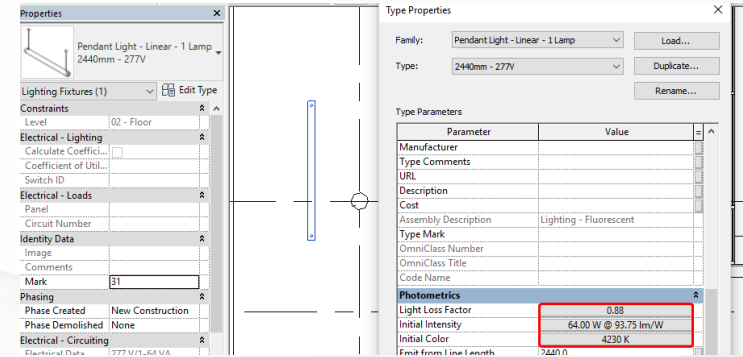
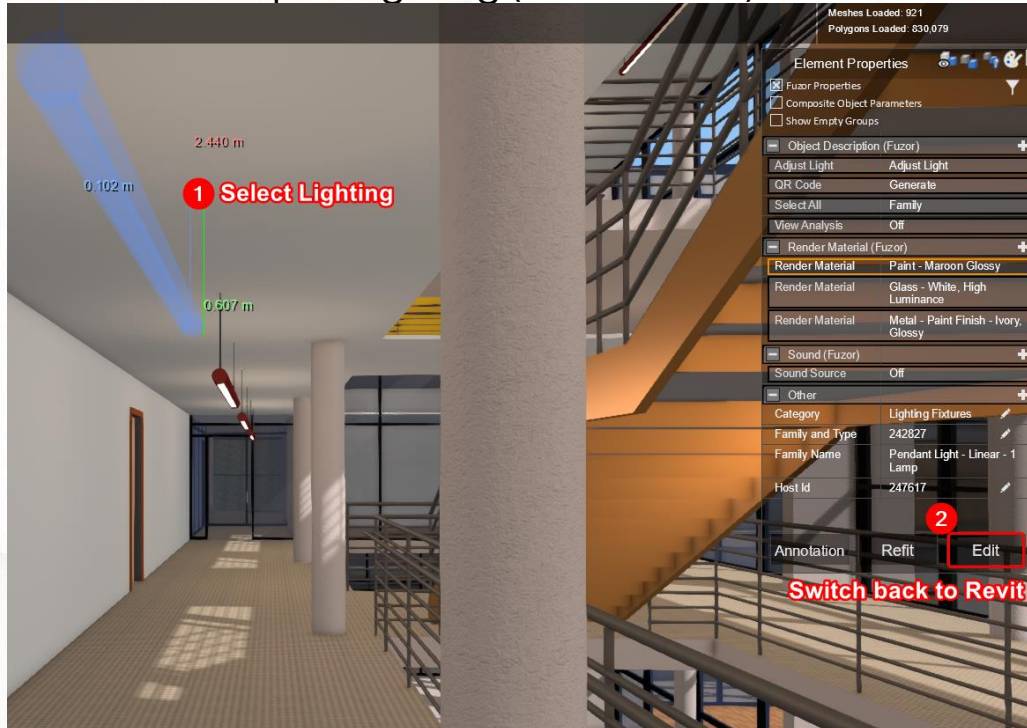
- 2.6.5 Tree Growth in Fly Through



2 Coordination, BIM analysis

2.7 Lighting Analysis

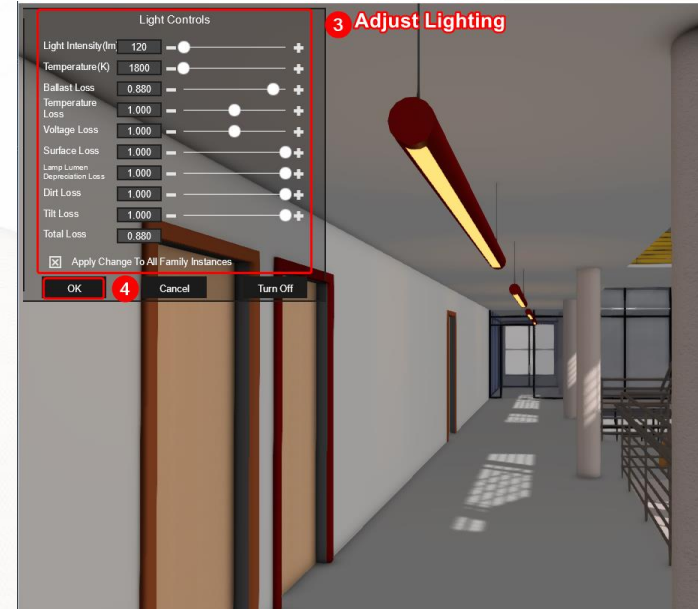
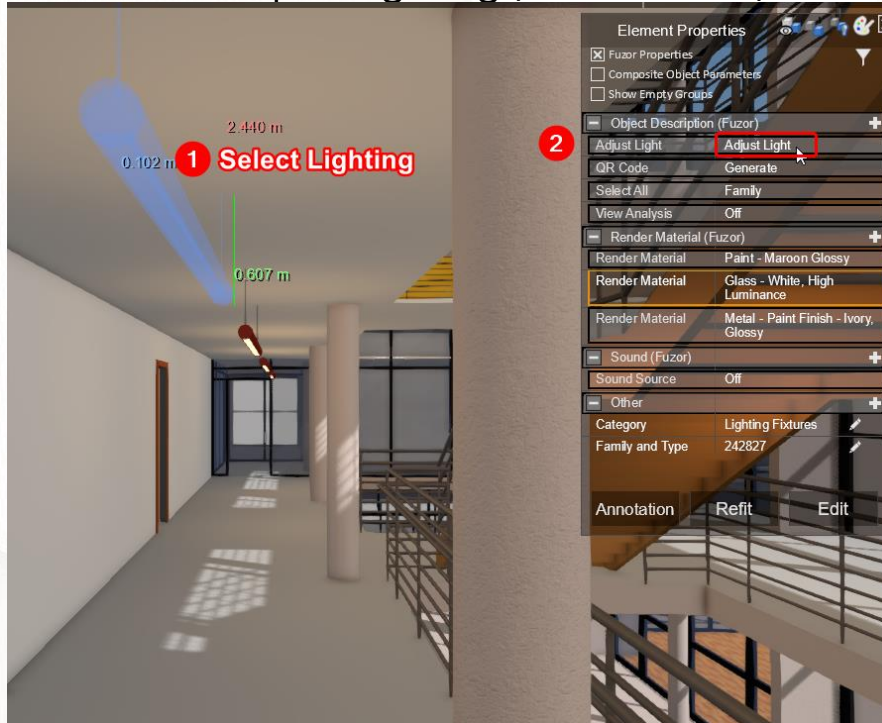
2.7.1 Adjust Lighting (Revit based)



2 Coordination, BIM analysis

■ 2.7 Lighting Analysis

- 2.7.2 Adjust Lighting (Fuzor based)

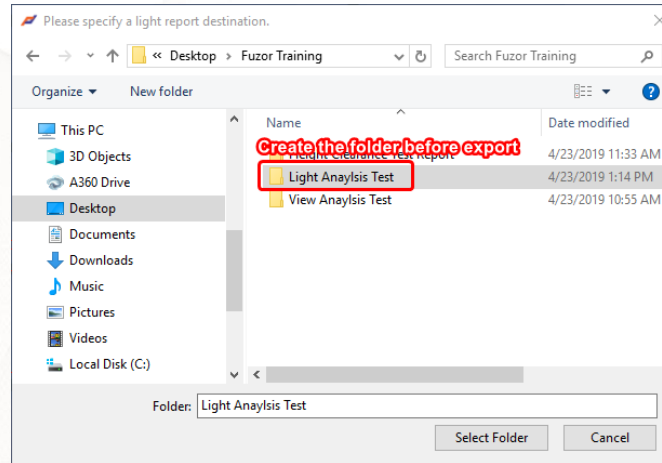
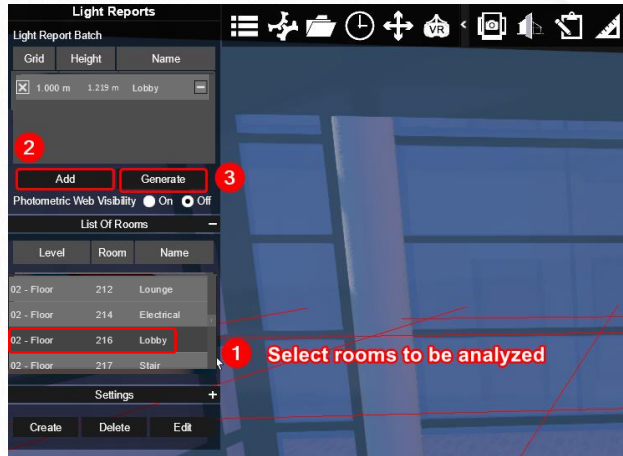


After adjusting lighting in Fuzor, you need to go back to Revit to set the corresponding light source information manually.

2 Coordination, BIM analysis

2.7 Lighting Analysis

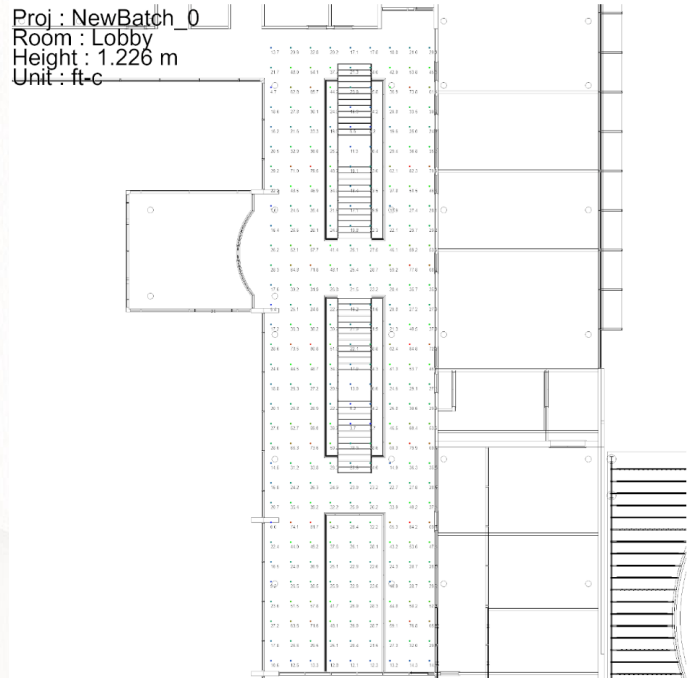
2.7.3 Lighting Analysis Report



2 Coordination, BIM analysis


■ 2.7 Lighting Analysis

- 2.7.3 Lighting Analysis Report



2 Coordination, BIM analysis

2.8 Edge Detection

Edge Detection

Edge Detection

Barrier Height0.800 m

Initial Spacing0.250 m

Refinement Spacing0.025 m

Drop Threshold0.500 m

Worker Height1.500 m

Barrier Radius0.250 m

☒ Show Markers☒ Show Edges

Calculate

Report

Reset

List Of Rooms

Level	Room	Name
03 - Floor	325	Conference
03 - Floor	326	Toilet
03 - Floor	327	Stair
03 - Floor	328	Corridor

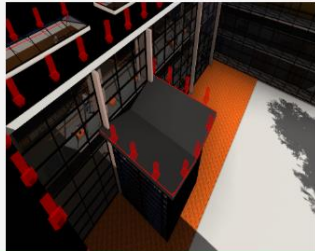
Auto Select Current Room☐

CreateDeleteEdit

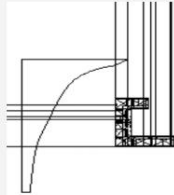
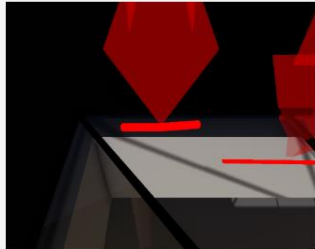


2 Coordination, BIM analysis

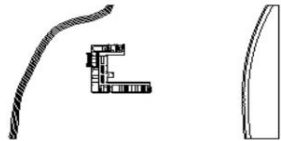
■ 2.8 Edge Detection



Element ID	142430
Category	Roof
Family	335
Type	Generic - 400mm
Level	03 - Floor



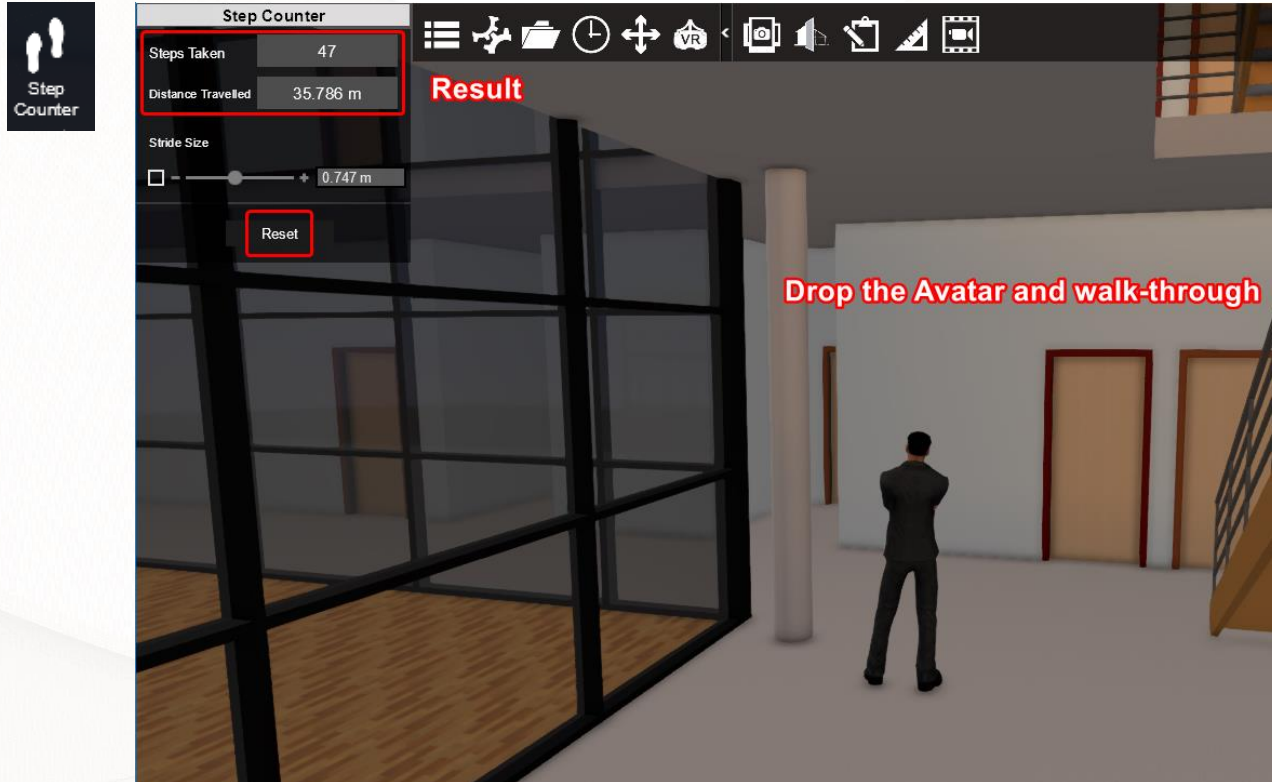
Element ID	165755
Category	Roof
Family	338
Type	Sloped Glazing
Level	Parapet



Element ID	173290
Category	Stair
Family	170657
Type	150mm max riser 300mm tread

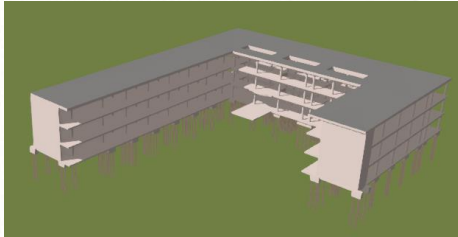
2 Coordination, BIM analysis

2.9 Step Counter

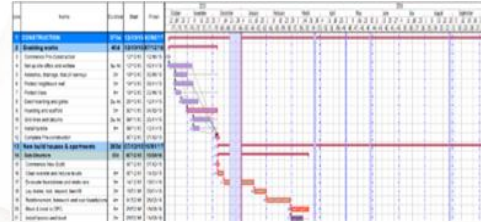


3 Construction Sequence Simulation

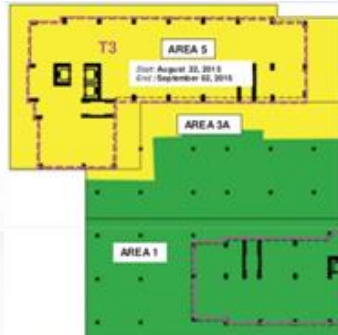
What materials should be ready before preparing construction sequence simulation?



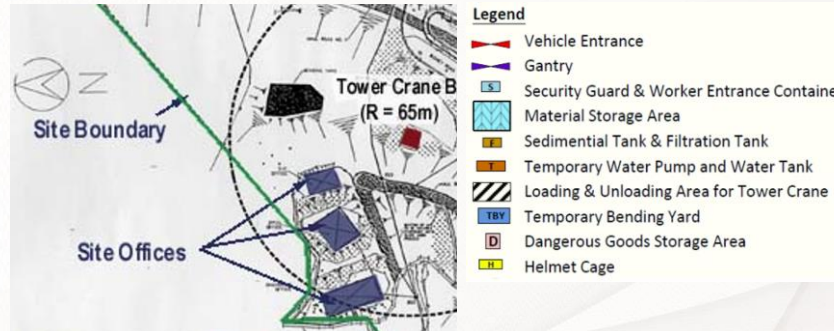
3D Model
(New Construction/ Existing Building...)



Construction Program/ Master Program



Construction Zoning Plan



Site Layout Plan



Construction Equipment/ vehicle

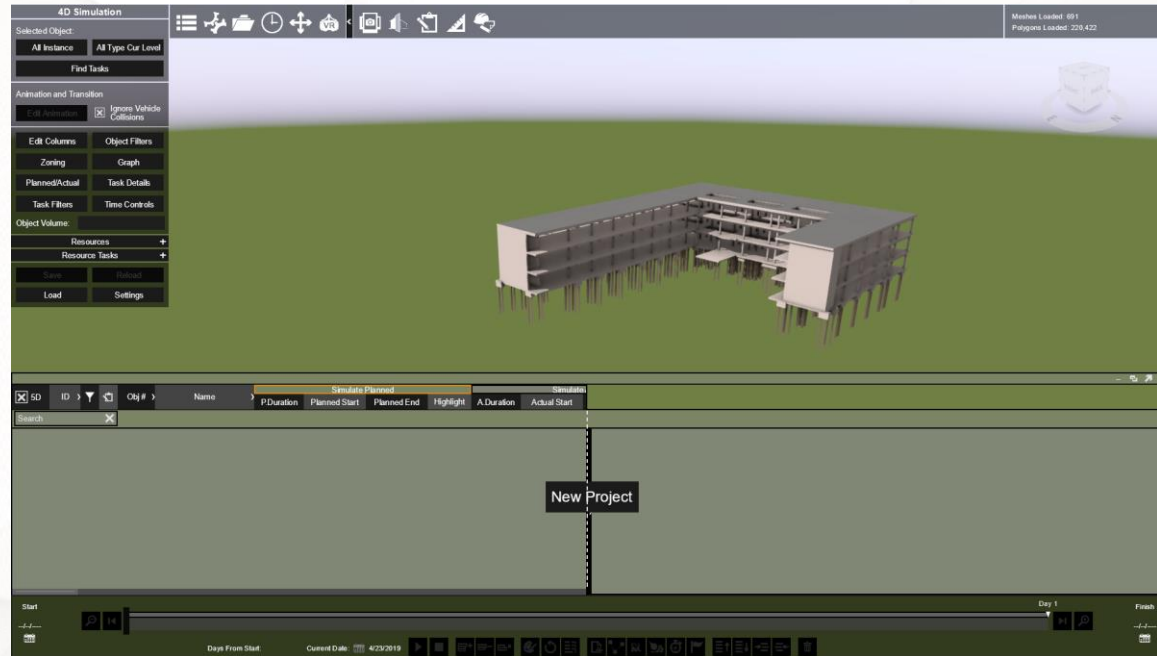
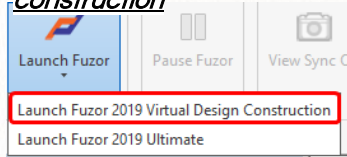
3 Construction Sequence Simulation

3.1 Preparation for construction sequence simulation

3.1.1 Create new project for simulation

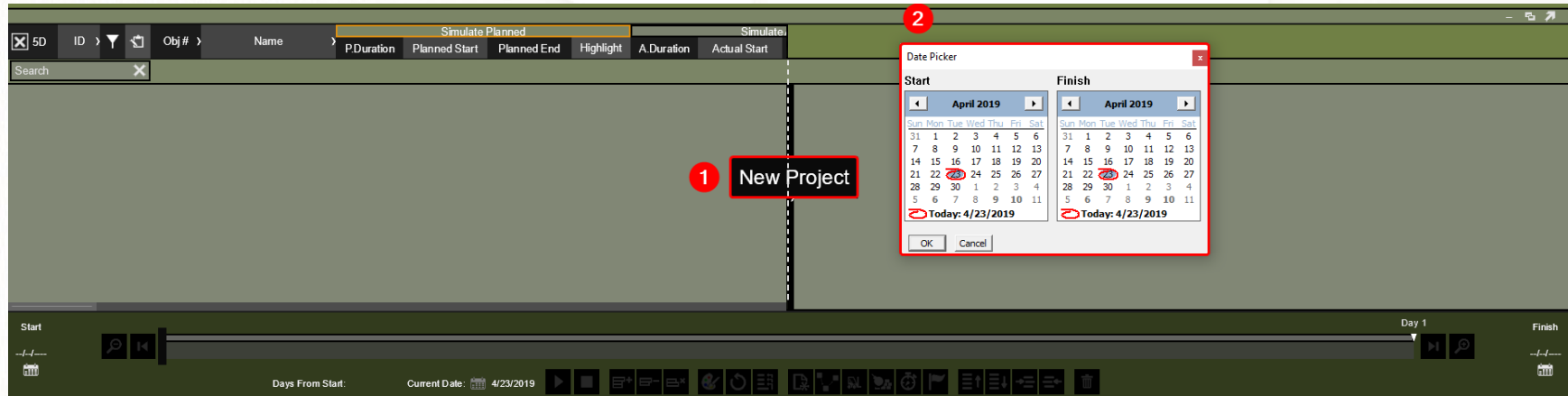


*Remember to use Fuzor VDC version for
construction*



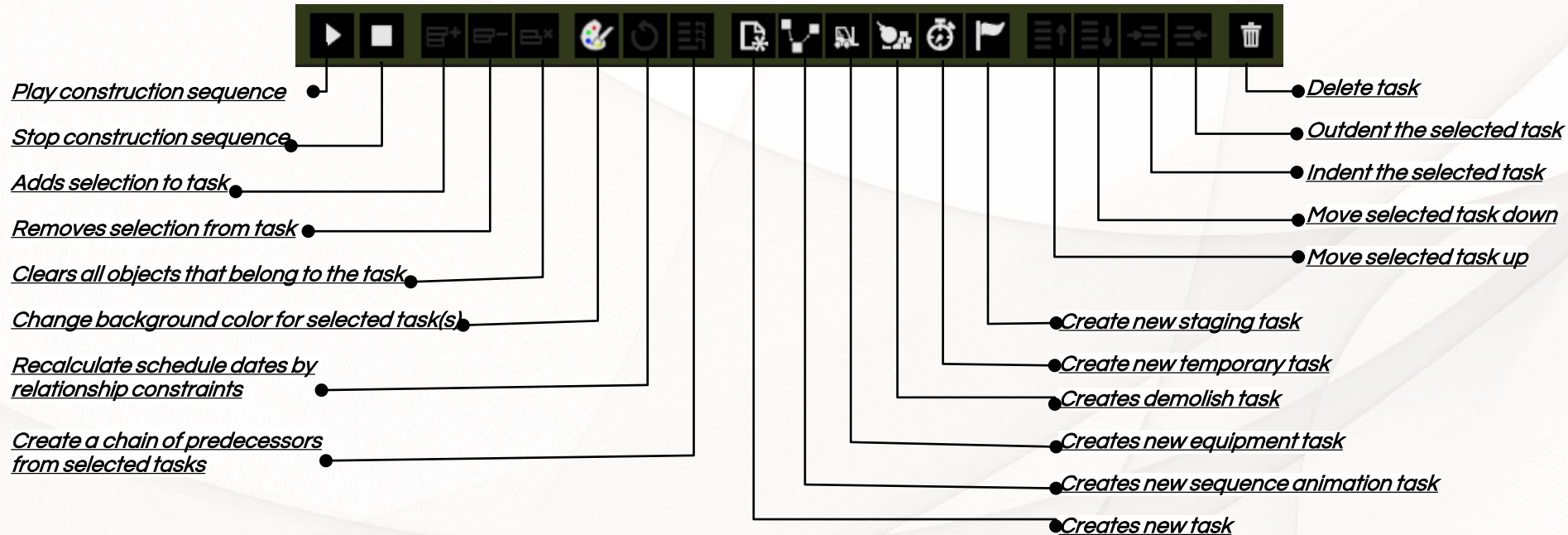
3 Construction Sequence Simulation

- 3.1 Preparation for construction sequence simulation
 - 3.1.1 Create new project for simulation



3 Construction Sequence Simulation

- 3.1 Preparation for construction sequence simulation
 - 3.1.2 Sequence Simulation UI



3 Construction Sequence Simulation

- 3.1 Preparation for construction sequence simulation
 - 3.1.3 Create new task and assign elements to task

The screenshot displays a software interface for construction sequence simulation. The top section features a table with columns for task details, organized into two main groups: 'Simulate Planned' and 'Simulate Actual'. The 'Simulate Planned' group includes columns for ID, Obj #, Name, P.Duration, Planned Start, Planned End, Highlight, A.Duration, Actual Start, Actual End, Highlight, EquipmentCost.P, MaterialCost.P, LaborCost.P, TotalCost.P, EquipmentCost.A, and MaterialCost.A. The 'Simulate Actual' group includes columns for T, W, T, F, and S. A search bar is located on the left side of the table. Below the table, a task named 'New Construction Task_1' is listed with a duration of 1 day, starting on 1/1/2019 and ending on 1/1/2019. The task is highlighted in orange. The bottom section of the interface shows a timeline from Day 1 to Day 731, with markers for specific days (Day 1, Day 75, Day 149, Day 223, Day 297, Day 371, Day 445, Day 519, Day 593, Day 667, Day 731). The timeline is labeled 'Start' on the left and 'Finish' on the right. A red circle with the number '3' and the text 'Create new task' points to a button in the bottom toolbar. Another red circle with the number '4' points to the 'Obj #' column header, and a third red circle with the number '5' points to the 'Planned Start' column header.

Simulate Planned														Simulate Actual													
ID	Obj #	Name	P.Duration	Planned Start	Planned End	Highlight	A.Duration	Actual Start	Actual End	Highlight	EquipmentCost.P	MaterialCost.P	LaborCost.P	TotalCost.P	EquipmentCost.A	MaterialCost.A	T	W	T	F	S						
1	0	New Construction Task_1	1 day	1/1/2019	1/1/2019		-- hours				0.00	0.00	0.00	0.00	0.00	0.00											

3 Construction Sequence Simulation

3.1 Preparation for construction sequence simulation

3.1.3 Create new task and assign elements to task

The screenshot displays the 4D Simulation software interface. The top section shows a 3D model of a building under construction, with a red circle and the text "7 Select the desired elements" overlaid. The bottom section shows a task list table with a red circle and the text "6 Select the task item" overlaid. The bottom-most section shows a timeline with a red circle and the text "8 Assign the elements to task" overlaid.

4D Simulation

Selected Object: All Instance All Type Cur Level
Find Tasks

Animation and Transition
Edit Animation ☒ Ignore Vehicle Collisions

Edit Columns Object Filters
Zoning Graph
Planned/Actual Task Details
Task Filters Time Controls

Object Volume:
Resources +
Resource Tasks +
Save Reload
Load Settings

2/11/2019 5:00:00 PM
Week 7
Day 42 (Monday)

7 Select the desired elements

6 Select the task item

ID	Name	Simulate Planned			Simulate Actual			Equipment Cost P	Material Cost P	Labor Cost P	Total Cost P	Equipment Cost A	Material Cost A	2/10/2019
		P.Duration	Planned Start	Planned End	A.Duration	Actual Start	Actual End							
1	Foundation	22 days	3/26/2019	2/19/2019				0.00	0.00	0.00	0.00	0.00	0.00	

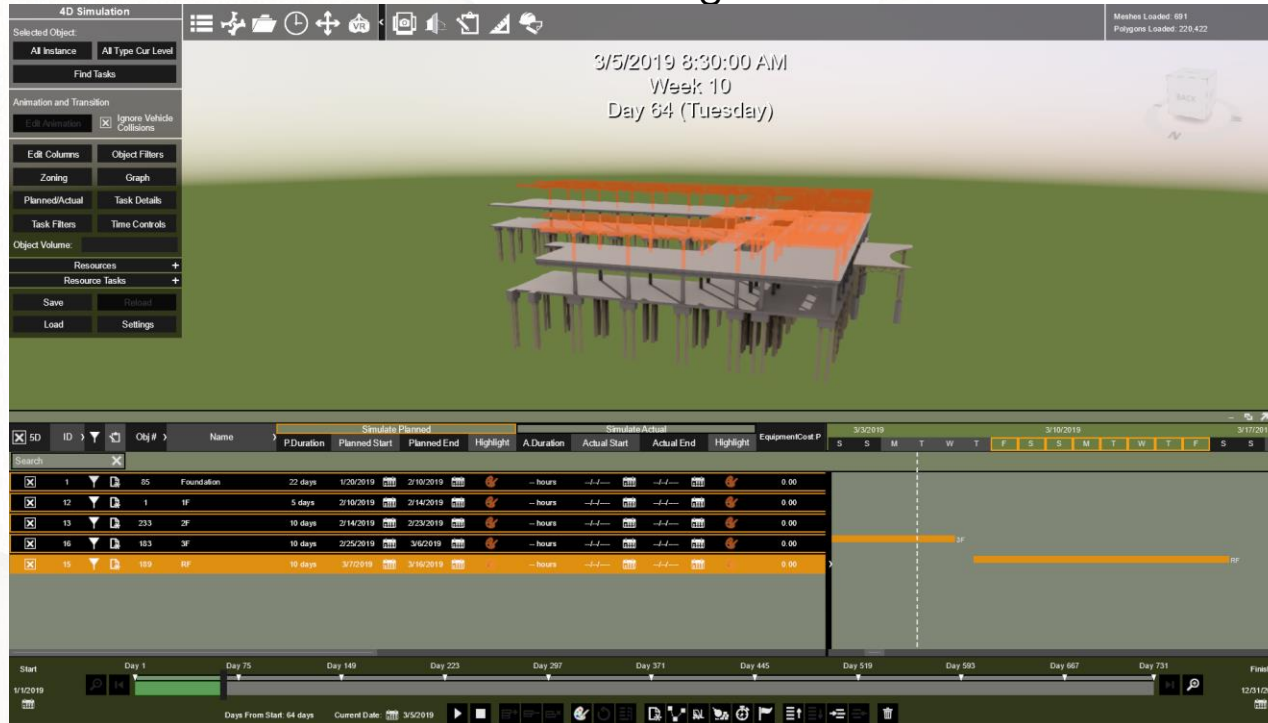
8 Assign the elements to task

Start 1/1/2019 Day 1 Day 75 Day 149 Day 223 Day 297 Day 371 Day 445 Day 519 Day 593 Day 667 Day 731 Finish 12/31/2020
Days From Start: 42 days Current Date: 2/11/2019

3 Construction Sequence Simulation

3.1 Preparation for construction sequence simulation

3.1.3 Create new task and assign elements to task



3 Construction Sequence Simulation

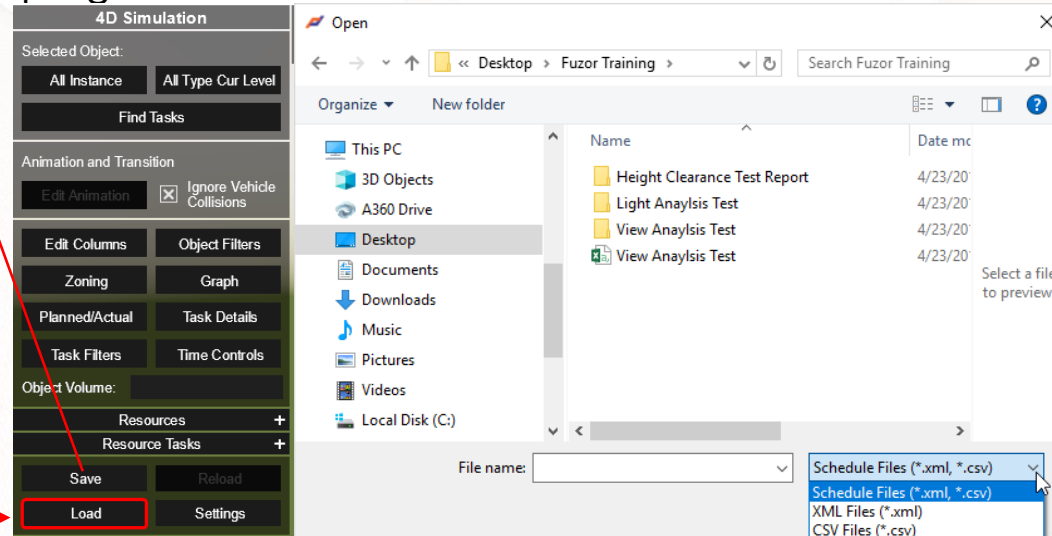
- 3.1 Preparation for construction sequence simulation
 - 3.1.4 Import Master program from other file formats

Export schedule in below formats:

Microsoft Project XML
Primavera P6 XML
Fuzor CSV

Compatible softwares for Program:

Microsoft Project
Asta Powerproject
Primavera P6
Navisworks CSV









3 Construction Sequence Simulation

3.1 Preparation for construction sequence simulation

3.1.5 Settings

Set highlighted Settings for simulation default

Highlight		
	Planned	Actual
Master		
<input type="checkbox"/> Master Override		
Construct		
Demolish		

4D Simulation

Selected Object:

All InstanceAll Type Cur Level

Find Tasks

Animation and Transition

Edit Animation

☒ Ignore Vehicle Collisions

Edit Columns

Object Filters

Zoning

Graph

Planned/Actual

Task Details

Task Filters

Time Controls

Object Volume:

Settings

Simulation Speed

1.00

Day(s)/Sec

☐ Exclude Weekend

☒ Auto Fill Duration

☒ Auto Calculate Schedule

Start Time

9

:

00

AM

Hrs Per Day

8

☒ Show Date

☒ Show Progress

☒ Fix sun position

☐ Hide Assigned Objects

☒ Cross-Section Fill

☒ Show Staging Pins

☒ Show Predecessor Lines

☒ Auto-Scroll Gantt Chart

☒ Auto-calculate WBS Dates

☒ Task Type☐ Task State

Highlight

Resources

Resource Tasks

Save

Reload

Load

Settings

- 3.1 Preparation for construction sequence simulation
 - 3.1.7 Edit Columns

The screenshot displays the Primavera P6 software interface. The top section shows a task list with columns for ID, Name, P Duration, Planned Start, Planned End, Highlight, A Duration, Actual Start, Actual End, Highlight, Equipment Cost P, Material Cost P, Labor Cost P, Total Cost P, Equipment Cost A, and Material Cost A. The tasks listed are:

ID	Name	P Duration	Planned Start	Planned End	Highlight	A Duration	Actual Start	Actual End	Highlight	Equipment Cost P	Material Cost P	Labor Cost P	Total Cost P	Equipment Cost A	Material Cost A
1	Foundation	22 days	1/26/2019	2/16/2019		— hours				0.00	0.00	0.00	0.00	0.00	0.00
12	1st	5 days	2/18/2019	2/14/2019		— hours				0.00	0.00	0.00	0.00	0.00	0.00
13	2nd	19 days	2/14/2019	2/23/2019		— hours				0.00	0.00	0.00	0.00	0.00	0.00
16	3rd	19 days	2/25/2019	3/6/2019		— hours				0.00	0.00	0.00	0.00	0.00	0.00
15	4th	19 days	3/7/2019	3/16/2019		— hours				0.00	0.00	0.00	0.00	0.00	0.00

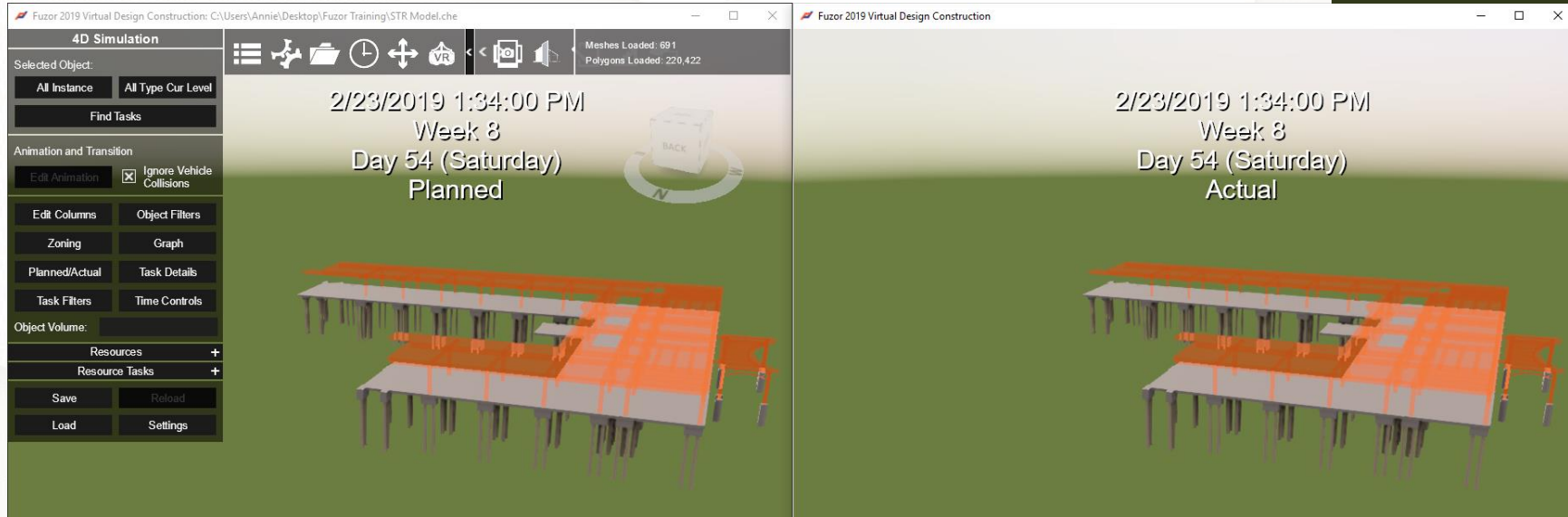
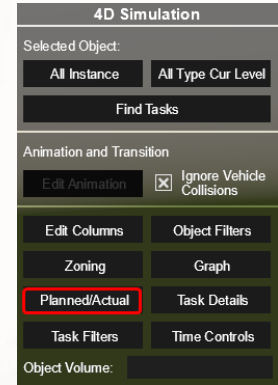
The bottom section shows a Gantt chart with a timeline from Day 1 to Day 731. The status bar at the bottom indicates 'Days From Start: 54 days' and 'Current Date: 2/23/2019'.

86

3 Construction Sequence Simulation

- 3.1 Preparation for construction sequence simulation
 - 3.1.9 Planned/ Actual

If Actual program schedule has been input in Fuzor, Planned and Actual sequence simulations can be shown in the same time with 2 pop-up windows.

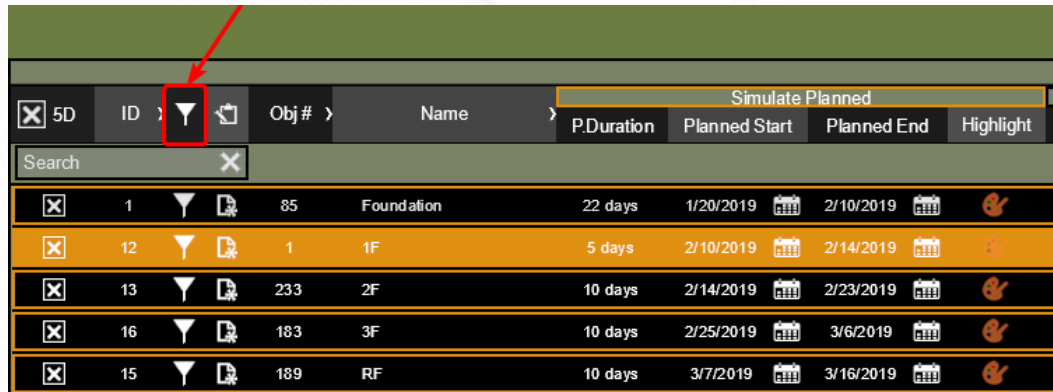


3 Construction Sequence Simulation

3.1 Preparation for construction sequence simulation

3.1.10 Task Filters

Settings for Task Filters



	5D	ID		Obj #	Name	P.Duration	Planned Start	Planned End	Highlight
	<input checked="" type="checkbox"/>	1		85	Foundation	22 days	1/20/2019	2/10/2019	
	<input checked="" type="checkbox"/>	12		1	1F	5 days	2/10/2019	2/14/2019	
	<input checked="" type="checkbox"/>	13		233	2F	10 days	2/14/2019	2/23/2019	
	<input checked="" type="checkbox"/>	16		183	3F	10 days	2/25/2019	3/6/2019	
	<input checked="" type="checkbox"/>	15		189	RF	10 days	3/7/2019	3/16/2019	

4D Simulation

Selected Object:

All Instance

All Type Cur Level

Find Tasks

Animation and Transition

Edit Animation

☒ Ignore Vehicle Collisions

Edit Columns

Object Filters

Zoning

Graph

Planned/Actual

Task Details

Task Filters

Time Controls

Object Volume:

Look Ahead Filter

☐ Enable Duration

1d

ex. 3d, 1w, 2m

☒ Current Date

☒ Schedule Date

☒ Include Overlap

☐ Include WBS Tasks

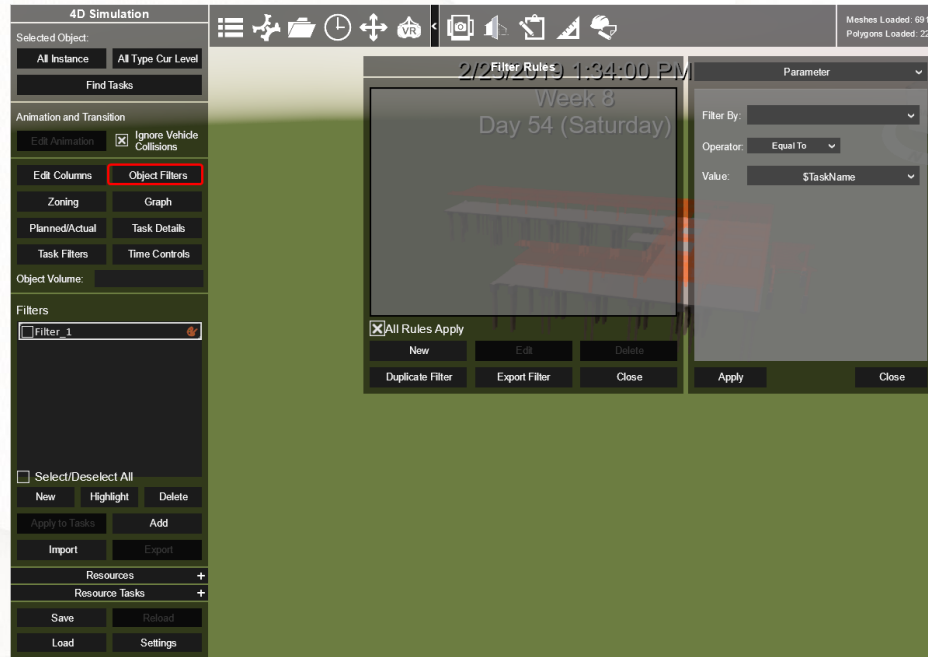
Export Tasks

3 Construction Sequence Simulation

■ 3.1 Preparation for construction sequence simulation

- 3.1.11 Object Filters

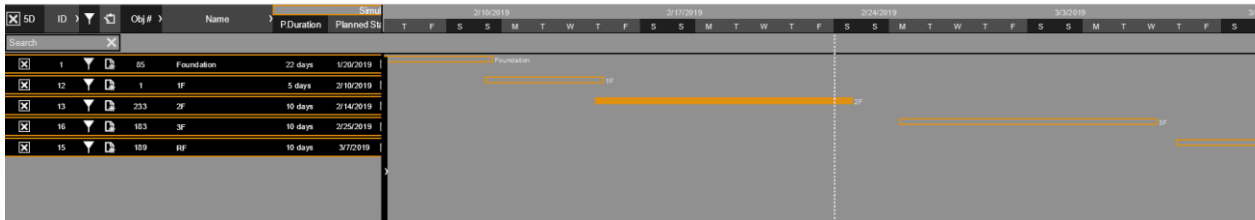
Prepare filter sets for elements (Rule-based)



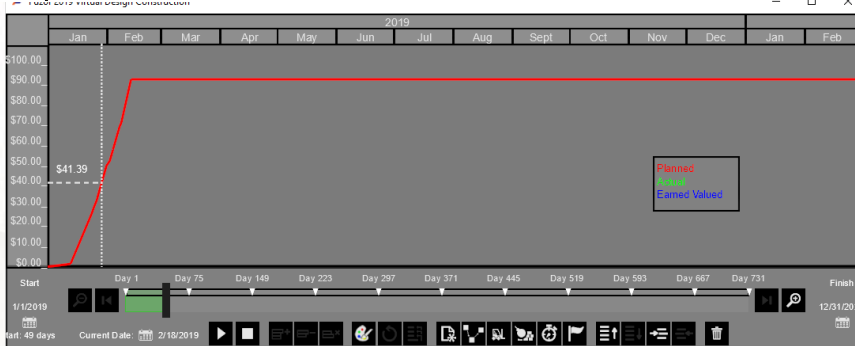
3 Construction Sequence Simulation

- 3.1 Preparation for construction sequence simulation
 - 3.1.12 Graph/ Timeline

Timeline: Time related



Graph: Cost related



4D Simulation

Selected Object:

Animation and Transition

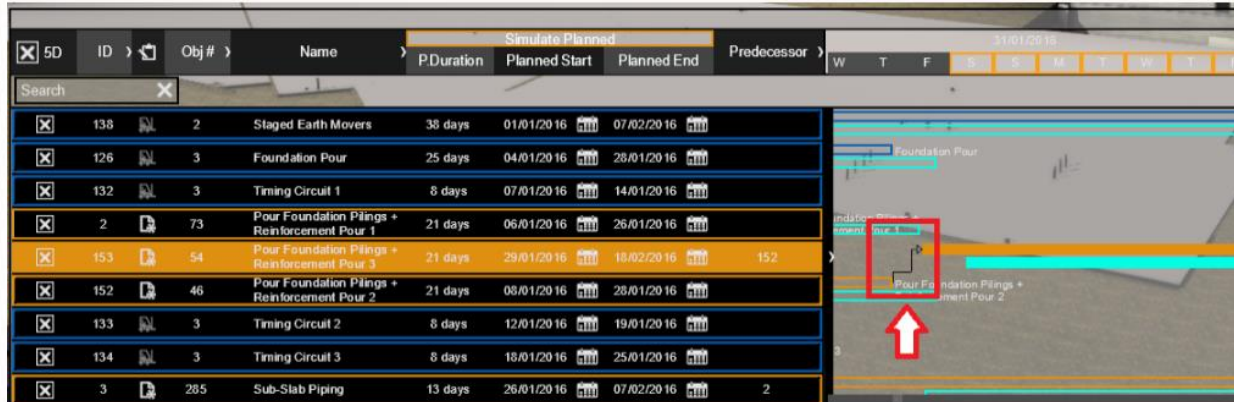
☒ Ignore Vehicle Collisions

Object Volume:

3 Construction Sequence Simulation

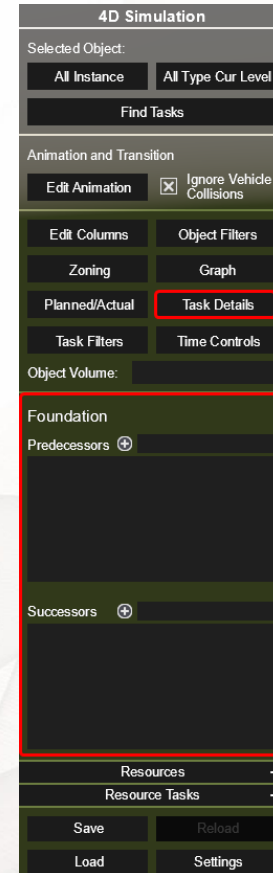
- 3.1 Preparation for construction sequence simulation
 - 3.1.13 Task Details

*Select the task first, then update the task details on
Predecessors and Successors*



The screenshot shows the 4D Simulation software interface. On the left is a task list table with columns for selection, ID, Obj #, Name, PDuration, Planned Start, Planned End, and Predecessor. The task 'Pour Foundation Piling + Reinforcement Pour 3' is highlighted in orange. On the right is a 3D model of a construction site with a red box and an arrow pointing to a specific task in the model.

	5D	ID	Obj #	Name	PDuration	Planned Start	Planned End	Predecessor
<input checked="" type="checkbox"/>		138	2	Staged Earth Movers	38 days	01/01/2016	07/02/2016	
<input checked="" type="checkbox"/>		126	3	Foundation Pour	25 days	04/01/2016	28/01/2016	
<input checked="" type="checkbox"/>		132	3	Timing Circuit 1	8 days	07/01/2016	14/01/2016	
<input checked="" type="checkbox"/>		2	73	Pour Foundation Piling + Reinforcement Pour 1	21 days	06/01/2016	26/01/2016	
<input checked="" type="checkbox"/>		153	54	Pour Foundation Piling + Reinforcement Pour 3	21 days	29/01/2016	18/02/2016	152
<input checked="" type="checkbox"/>		152	46	Pour Foundation Piling + Reinforcement Pour 2	21 days	08/01/2016	28/01/2016	
<input checked="" type="checkbox"/>		133	3	Timing Circuit 2	8 days	12/01/2016	19/01/2016	
<input checked="" type="checkbox"/>		134	3	Timing Circuit 3	8 days	18/01/2016	25/01/2016	
<input checked="" type="checkbox"/>		3	285	Sub-Slab Piping	13 days	26/01/2016	07/02/2016	2



The screenshot shows the 4D Simulation software interface with the Task Details panel open. The panel is titled '4D Simulation' and contains several sections: 'Selected Object' with buttons for 'All Instance' and 'All Type Cur Level', a 'Find Tasks' button, 'Animation and Transition' with 'Edit Animation' and 'Ignore Vehicle Collisions' (checked), 'Edit Columns' and 'Object Filters', 'Zoning' and 'Graph', 'Planned/Actual' and 'Task Details' (highlighted with a red box), 'Task Filters' and 'Time Controls', 'Object Volume:', 'Foundation' section with 'Predecessors' and 'Successors' (both with expand/collapse icons), 'Resources' and 'Resource Tasks' sections with expand/collapse icons, and 'Save', 'Reload', 'Load', and 'Settings' buttons.

3 Construction Sequence Simulation

- 3.1 Preparation for construction sequence simulation
 - 3.1.14 Time Controls

Settings for Time controls

The screenshot displays the '4D Simulation' software interface. The 'Time Controls' section is highlighted with a red box. It includes a 'Current Date' field set to '2/11/2019' with a calendar icon, and 'Current Day' and 'Current Week' fields set to '42' and '7' respectively, each with increment/decrement buttons. Other visible sections include 'Selected Object' with 'All Instance' and 'All Type Cur Level' buttons, 'Find Tasks', 'Animation and Transition' with 'Edit Animation' and 'Ignore Vehicle Collisions' (checked), and a grid of buttons for 'Edit Columns', 'Object Filters', 'Zoning', 'Graph', 'Planned/Actual', 'Task Details', 'Task Filters', and 'Time Controls' (highlighted). At the bottom, there are sections for 'Object Volume', 'Resources', 'Resource Tasks', and a grid of buttons for 'Save', 'Reload', 'Load', and 'Settings'.

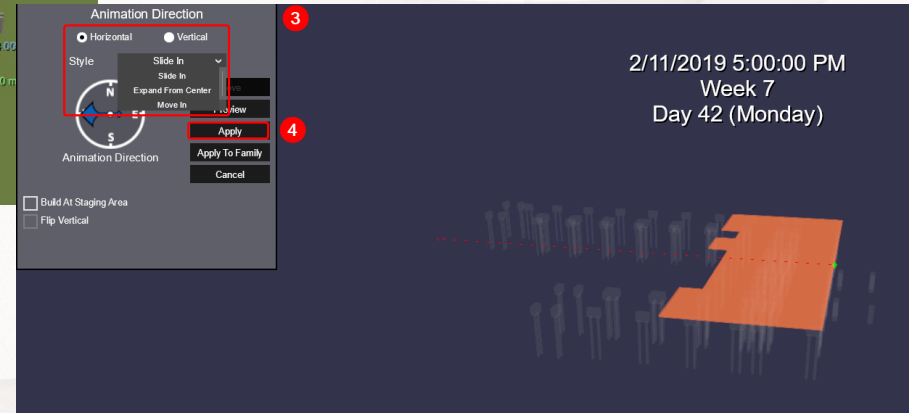
4D Simulation	
Selected Object:	
All Instance	All Type Cur Level
Find Tasks	
Animation and Transition	
Edit Animation	<input checked="" type="checkbox"/> Ignore Vehicle Collisions
Edit Columns	Object Filters
Zoning	Graph
Planned/Actual	Task Details
Task Filters	Time Controls
Object Volume:	
4D Time Controls	
Current Date	2/11/2019
Current Day	42
Current Week	7
Resources	
Resource Tasks	
Save	Reload
Load	Settings

3 Construction Sequence Simulation

3.1 Preparation for construction sequence simulation

3.1.15 Animation/ Transition of Element

Assign transition direction/ show-up direction of selected objects



3 Construction Sequence Simulation

- 3.1 Preparation for construction sequence simulation
 - 3.1.16 Find Tasks

Find the tasks assigned of the selected elements

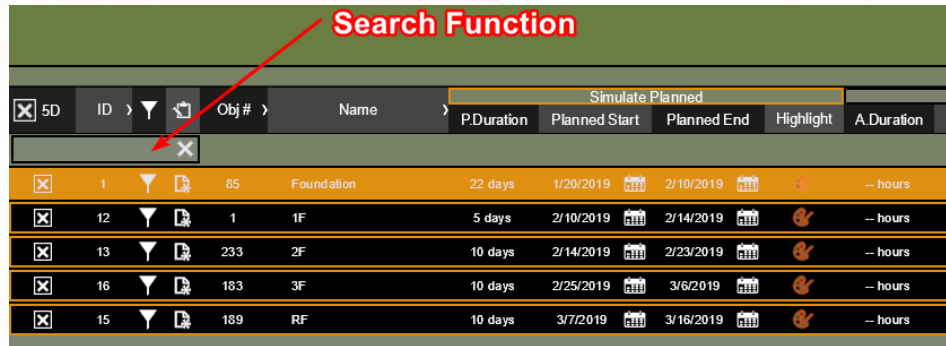


3 Construction Sequence Simulation

- 3.1 Preparation for construction sequence simulation
 - 3.1.16 Search Tasks

Search the tasks through "ID" and "Name"

Search Function

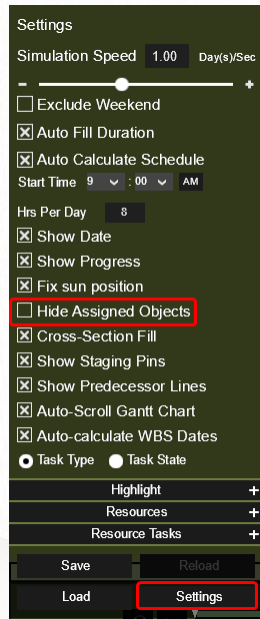


Simulate Planned									
5D	ID	Obj #	Name	P.Duration	Planned Start	Planned End	Highlight	A.Duration	
<input checked="" type="checkbox"/>	1	85	Foundation	22 days	1/20/2019	2/10/2019		-- hours	
<input checked="" type="checkbox"/>	12	1	1F	5 days	2/10/2019	2/14/2019		-- hours	
<input checked="" type="checkbox"/>	13	233	2F	10 days	2/14/2019	2/23/2019		-- hours	
<input checked="" type="checkbox"/>	16	183	3F	10 days	2/25/2019	3/6/2019		-- hours	
<input checked="" type="checkbox"/>	15	189	RF	10 days	3/7/2019	3/18/2019		-- hours	

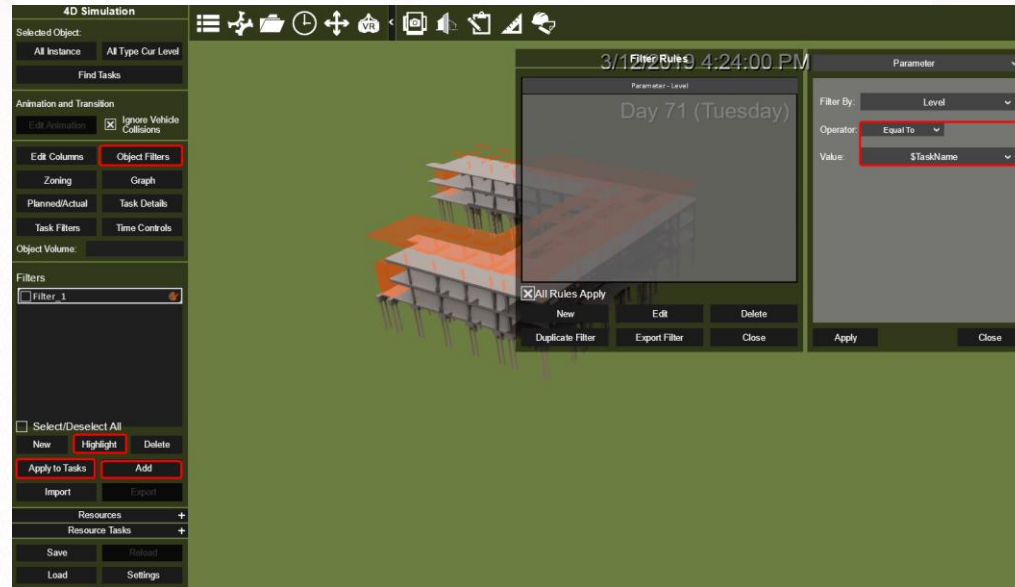
3 Construction Sequence Simulation

3.1 Preparation for construction sequence simulation

3.1.17 Tips



"Hide Assigned Objects" @ Settings



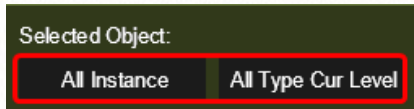
Object Filters

3 Construction Sequence Simulation

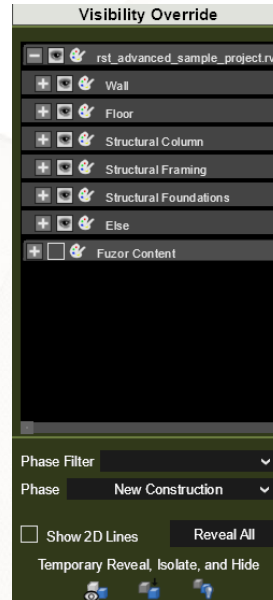
- 3.1 Preparation for construction sequence simulation
 - 3.1.17 Tips



Temporary Visibility @ Element Properties



Object Selection Method



Visibility Override

3 Construction Sequence Simulation

3.1 Preparation for construction sequence simulation

3.1.18 Place Fuzor components



Pedestrians

Random Male

Jack

Alex

Dwayne

Animation

Idle

Characteristics

NPC Height 0.00 m

Walking Speed

Save Placement Load Placement

Vehicle

Type Construction

LTM 1100 Hourly Rate 0.00
Turn Radius: 5.00 m

LTM 1070 Hourly Rate 0.00
Turn Radius: 5.00 m

LTM 1300 Hourly Rate 0.00
Turn Radius: 5.00 m

DEMAG CC3800 1250t Hourly Rate 0.00
Turn Radius: 8.00 m

Respawn After: 5 seconds

☒ Show Path

Save Placement Load Placement

Equipment

Type Construction

Delineator Unit Price 0.00
Placement

Privacy Fence Unit Price 0.00
Placement

Temporary Fence Unit Price 0.00
Placement

Safety Barrier 36 Unit Price 0.00
Placement

☒ Show Path

Save Placement Load Placement

Turn Radius

3 Construction Sequence Simulation

- 3.1 Preparation for construction sequence simulation
 - 3.1.19 Create equipment animation to demonstrate method of statements



3 Construction Sequence Simulation

3.2 Produce 4D video



Similar to Section 2.2.1 Fly Through Video



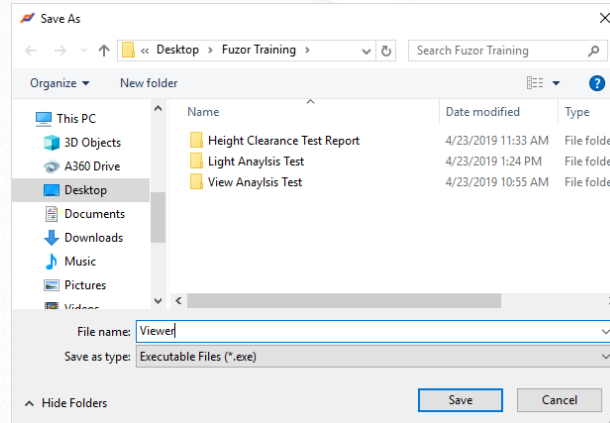
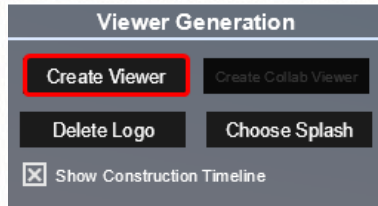
3 Construction Sequence Simulation

3.3 4D viewer

3.3.1 Create 4D viewer



Understanding the high requirements on hardware specifications and license issues between clients and project teams, users can export a file in exe. Format (Viewer Generation) for information exchange with Fuzor. Users, who do not have Fuzor software, can review the model by exe. format



3 Construction Sequence Simulation

▪ 3.3 4D viewer

- 3.3.2 4D viewer (Problem-solving)

 Viewer Application 385,991 KB

Please note: The viewer is 64-bit and will not be able to run on a 32-bit machine.

If you find System Error when opening the viewer file, please use the following links to install the required files.

- Microsoft Visual C++ 2010 Redistributable Package (x64):
<http://www.microsoft.com/en-us/download/details.aspx?id=14632>
- DirectX End-User Runtime Web Installer:
<https://www.microsoft.com/en-us/download/details.aspx?displayLang=en&id=35>

Examples of possible errors include:

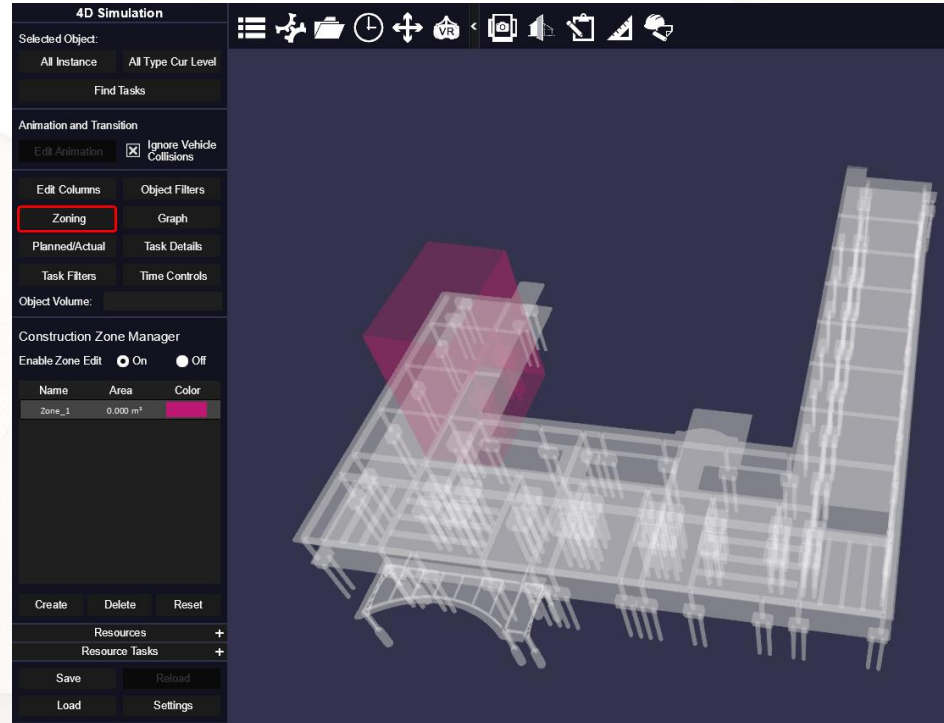
- This program can't start because d3dx9_43.dll is missing from your computer. Try reinstalling the program to fix this problem.
- The program can't start because MSVCR100.dll is missing from your computer. Try reinstalling the program to fix this issue.
- The program can't start because X3DAudio1_7.dll is missing from your computer. Try reinstalling the program to fix this problem.

3 Construction Sequence Simulation

- 3.4 Preparation for construction sequence simulation

- 3.4.1 Zoning

Assign Zoning in Fuzor



3 Construction Sequence Simulation

3.4 Advanced Techniques for construction sequence simulation



3.4.1 Staging Task

Add objects to a staging area

1/1/2019 9:00:00 AM
Week 1
Day 1 (Tuesday)

2 Click on the staging area
Better to Pin on elements.

(Material on site)
Arrangement Setting

Staging Area

Row Length: 5
Row Direction: East
Row Stack Direction: South
☐ Disable Stacking
Move Apply Close

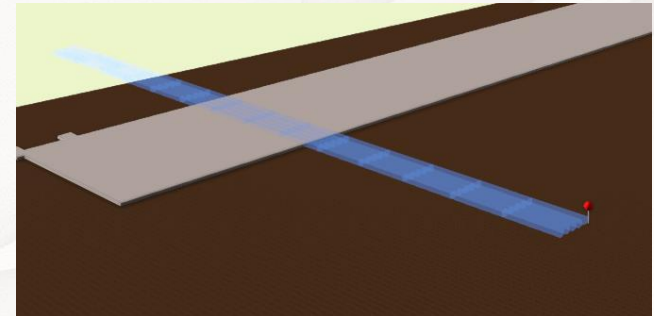
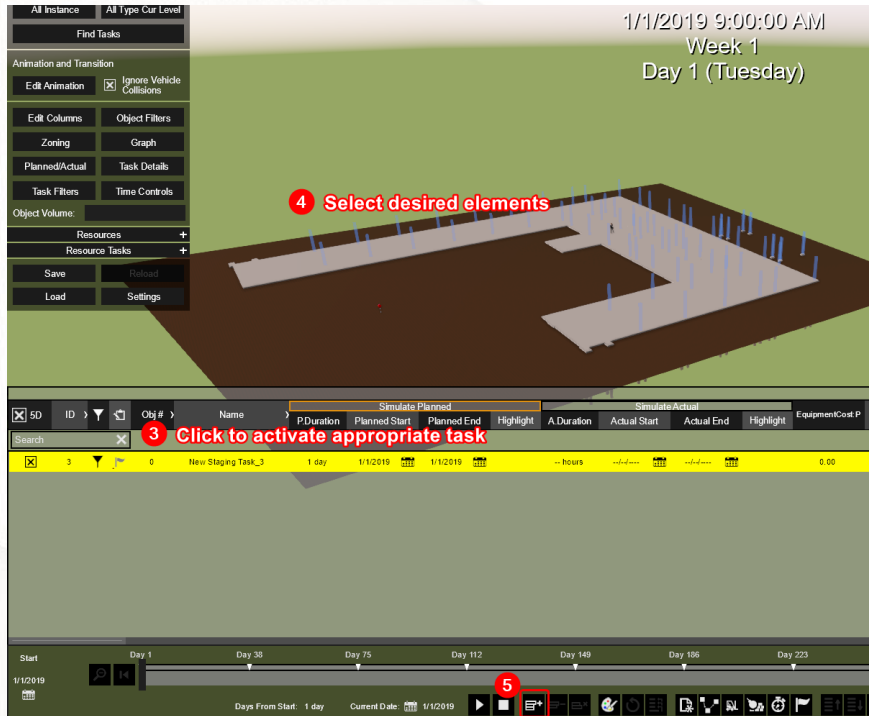
Staging Task in Timeline

1

3 Construction Sequence Simulation

- 3.4 Advanced Techniques for construction sequence simulation

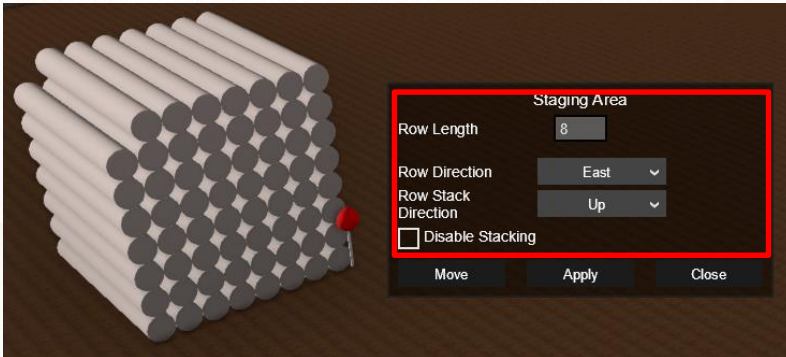
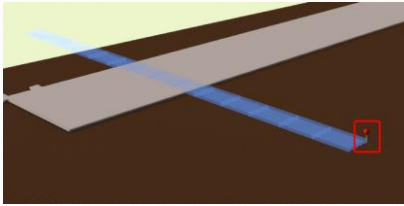
- 3.4.1 Staging Task



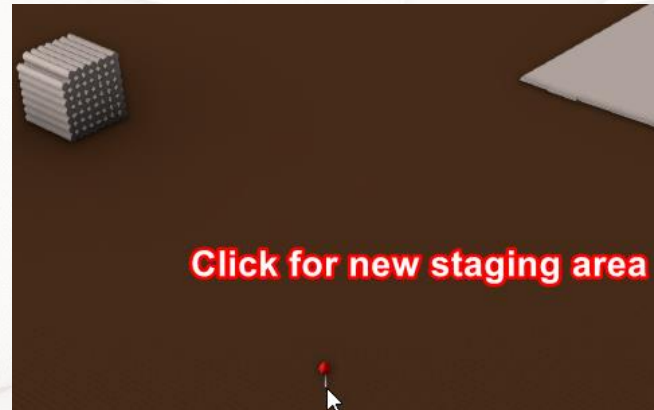
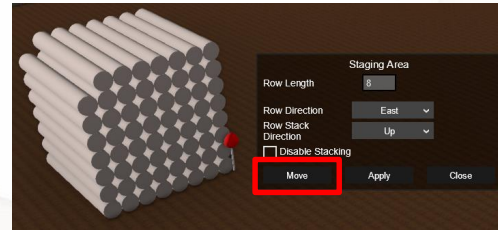
3 Construction Sequence Simulation

- 3.4 Advanced Techniques for construction sequence simulation
 - 3.4.1 Staging Task

Click "Red Pin" to reset the materials arrangement



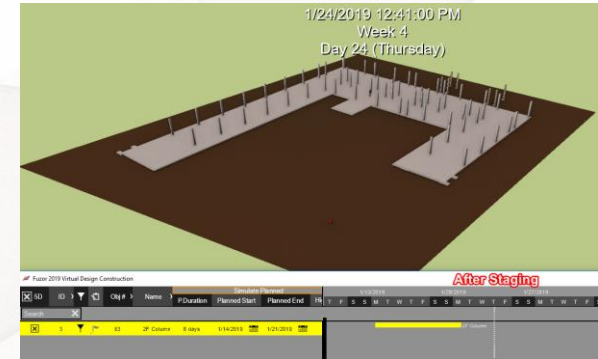
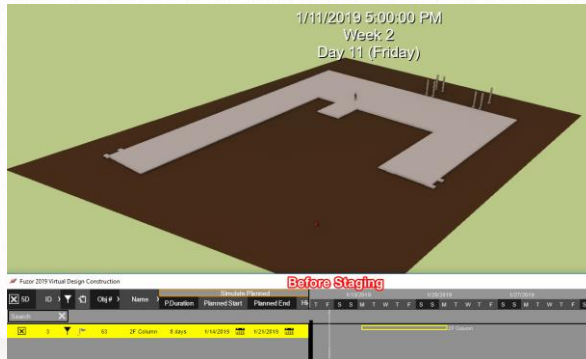
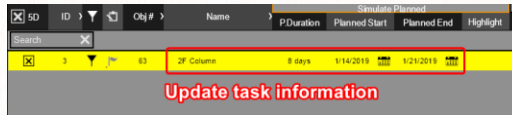
Click "Red Pin" and "Move" to relocate the stage area



3 Construction Sequence Simulation

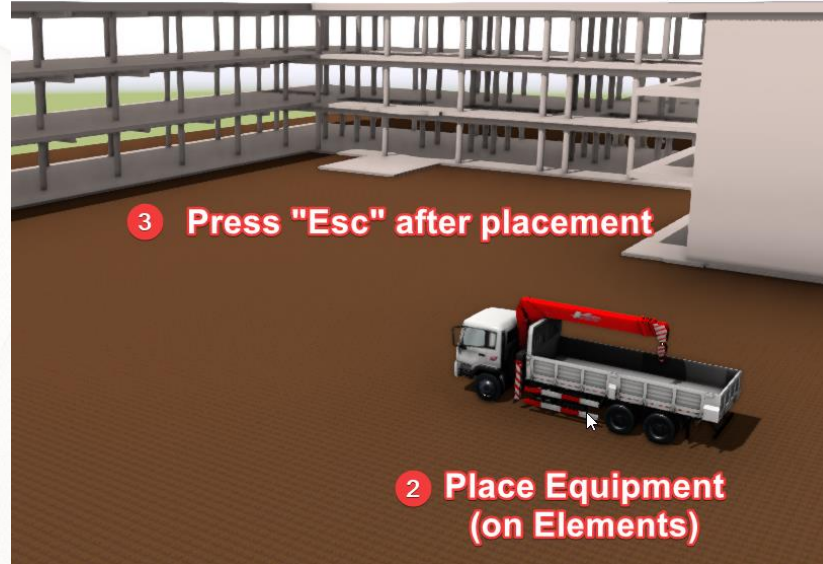
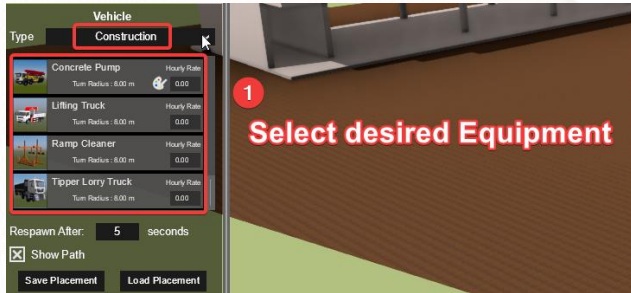
- 3.4 Advanced Techniques for construction sequence simulation
 - 3.4.1 Staging Task

Set Staging Task schedule



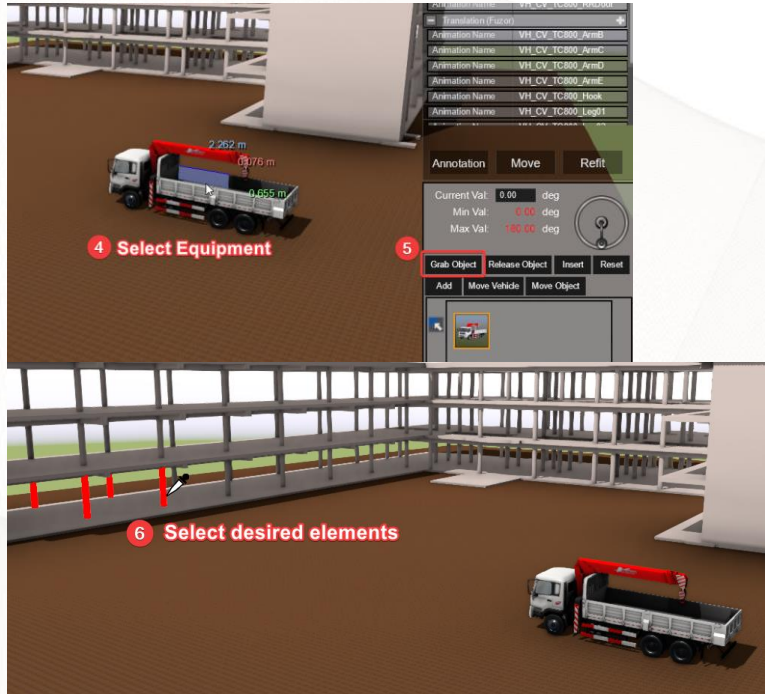
3 Construction Sequence Simulation

- 3.4 Advanced Techniques for construction sequence simulation
 - 3.4.2 Grabbing Element with Fuzor Equipment



3 Construction Sequence Simulation

- 3.4 Advanced Techniques for construction sequence simulation
 - 3.4.2 Grabbing Element with Fuzor Equipment



Hints:

- Hold "Ctrl" to select more than one elements.
- Group elements first before selection.
- Make use of "Visibility Control".
- Make use of "Filter".

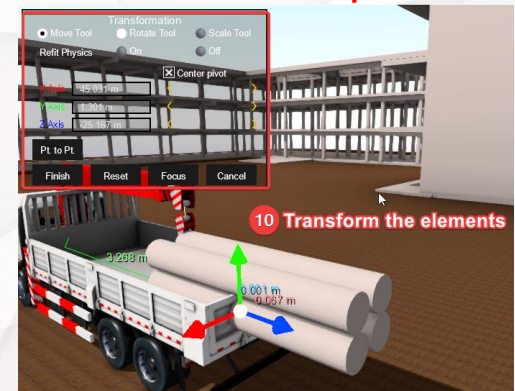
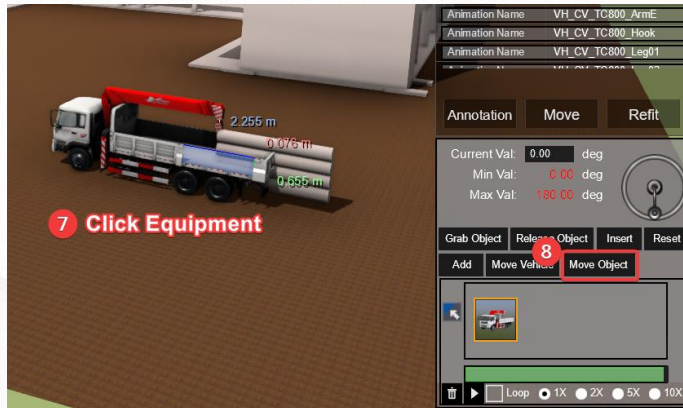


3 Construction Sequence Simulation

- 3.4 Advanced Techniques for construction sequence simulation
 - 3.4.2 Grabbing Element with Fuzor Equipment



If the arrangement is not satisfactory, click "Move Object" to re-arrange.



3 Construction Sequence Simulation

- 3.4 Advanced Techniques for construction sequence simulation
 - 3.4.2 Grabbing Element with Fuzor Equipment



Before you prepare a new action for the equipment, press "Add" to create a new capture/ scene.

"Insert" is to insert a new capture/ scene in between the current films.

"Reset" is to retrieve the first capture of the films.



Hold "Shift" to rotate the Equipment.

3 Construction Sequence Simulation

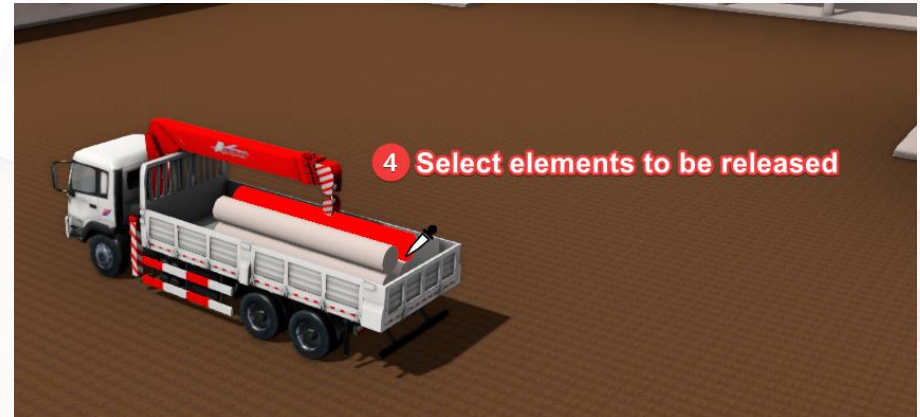
3.4 Advanced Techniques for construction sequence simulation

3.4.2 Grabbing Element with Fuzor Equipment



3 Construction Sequence Simulation

- 3.4 Advanced Techniques for construction sequence simulation
 - 3.4.3 Release Element (Directly) with Fuzor Equipment

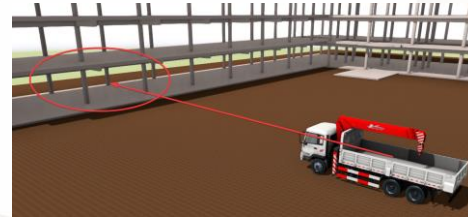


3 Construction Sequence Simulation

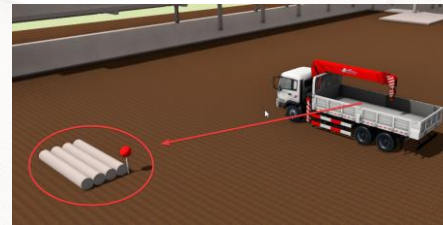
- 3.4 Advanced Techniques for construction sequence simulation
 - 3.4.3 Release Element (Directly) with Fuzor Equipment



Original



Staged



Custom Drop



3 Construction Sequence Simulation

- 3.4 Advanced Techniques for construction sequence simulation
 - 3.4.4 Release Element (with Animation) with Fuzor Equipment



3 Construction Sequence Simulation

- 3.4 Advanced Techniques for construction sequence simulation
 - 3.4.4 Release Element (with Animation) with Fuzor Equipment



Release Object
[Refer to 3.4.3 Release Element
(Directly) with Fuzor Equipment]



3 Construction Sequence Simulation

3.5 Preparation for 5D construction sequence simulation (Cost)

3.5.1 Resources Settings

Set highlighted Settings for resources default

Click to change the measurement between quantity and volume

Click to change the cost between material and labour cost

Unit Price

Total Volume / Quantity

Volume / Quantity which has not been added into tasks

Name of category

Name	Type	Total	Available	Unit Price
Concrete	Material	2400.00	2400.00	90.00

Automatically Fill in Cost Fields

New Delete Tasks Close

4D Simulation

Selected Object:

All Instance All Type Cur Level

Find Tasks

Animation and Transition

Edit Animation ☒ Ignore Vehicle Collisions

Edit Columns Object Filters

Zoning Graph

Planned/Actual Task Details

Task Filters Time Controls

Object Volume:

Resources

Unit Price	Name	Amount

☐ Edit Total Cost

☐ Automatically Fill in Cost Fields

☐ Automatic Category Resources

New Delete

Export PDF Export CSV

Resource Tasks

ID	Task Name	Using	Cost

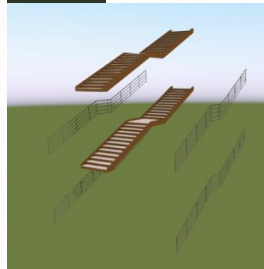
Delete

Save Reload

Load Settings

3 Construction Sequence Simulation

3.6 Sequence Animation



Property Services Branch
Architectural Services Department

Building Information Modelling (BIM) Guide for Facilities Upkeep

(Version 1.1)

Objective

The primary purpose of this Guide is to provide a common reference on the adoption of BIM in As-built Modelling for Facilities Upkeep in building projects including capital works projects, entrustment works, subvented capital works projects and works that are undertaken by private parties with project estimates more than \$30 million and will be handed back to ArchSD for maintenance according to Development Bureau Technical Circular (Works) No. 18/2018 or the latest version.

Disclaimer

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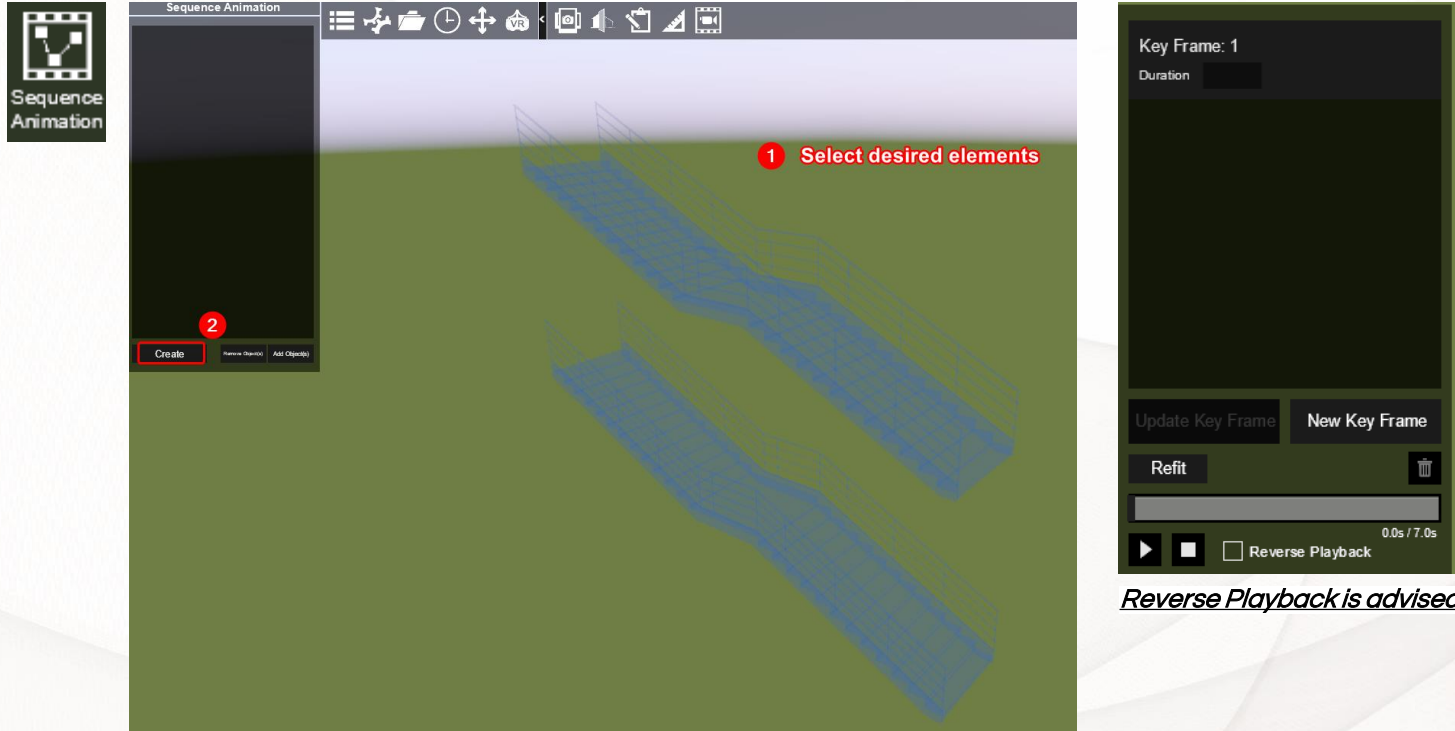
Users are responsible for making their own assessments and judgement of all information contained in or in connection with this Guide and are advised to seek independent verification as to its accuracy, currency or completeness. The department accepts no liability for any use of the said information and data or reliance placed on it. The department does not accept any responsibilities for any special, indirect or consequential loss or damages whatsoever arising out of or in connection with the use of this Guide.

The Architectural Services Department reserves the right to omit, edit or update the Guide at any time in its absolute discretion without any prior notice.

Item	Element	Graphic Model Element Level of Development (LOD)	Non-graphic information Level of Development (LOD)	3D Animation	BIM Object from original manufacturer	Photo record (other than 360° photos)	Other Modelling Requirements	Other Supporting Information
17.0	Landscape Work							
17.1	Elements under this trade	350	500	✗	✓ (if available)	✗		
18.0	Geotechnical Works							
18.1	Elements under this trade	350	500	✗	✓ (if available)	✗		
19.0	Trees							
19.1	Elements under this trade	200	350	✗	✗	✓		For i) OVT and ii) trees on registered SIMAR slope only.
20.0	Curtain Wall							
20.1	Elements under this trade	500	500	✓ (in LOD 350 or above; Step-by-step process showing the assemble & disassemble of fixtures)	✓ (if available)	✓	1) Showing details including fixing, connection, anchorages, spandrels & supporting system, type of finishes, water bars, movement joints, etc. 2) Showing maintenance access.	1) Contractor / Specialist Contractor information. 2) Information & specification of the materials, e.g. glazing, ironmongeries, supporting framework, ironmongeries, fire insulation, fixing & connection, coated finishes, water bars, movement joint, sealant, etc. 3) OTTV calculation. 4) O&M manual. 5) Warranty. 6) Cyclical maintenance requirement (if applicable).
21.0	Others (not mentioned above)							
21.1	Elements under this trade	350	500	✗	✓ (if available)	✓		1) Cyclical maintenance requirement (if applicable).
21.2	Special feature / Building structure with historical value (*exact feature / structure to be specified by the PSB)	350	500	✗ (unless otherwise specified)	✗	✓	1) Showing maintenance access	1) Ditto (to Item 21.1). 2) 3D digital point cloud scanning.

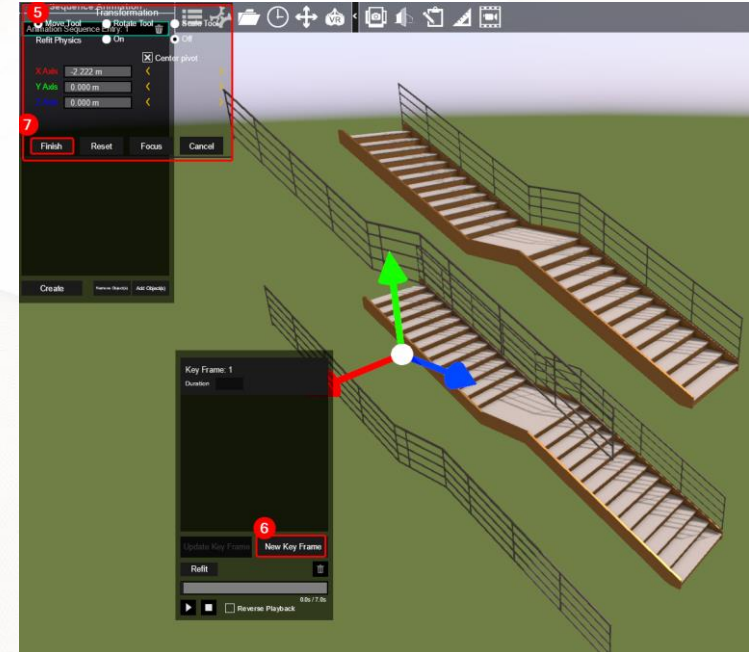
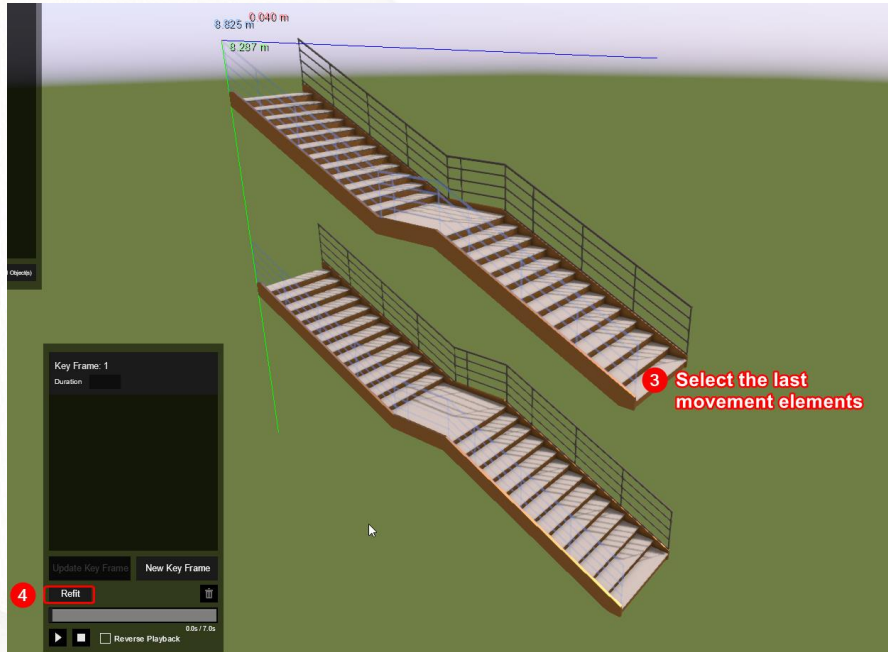
3 Construction Sequence Simulation

■ 3.6 Sequence Animation



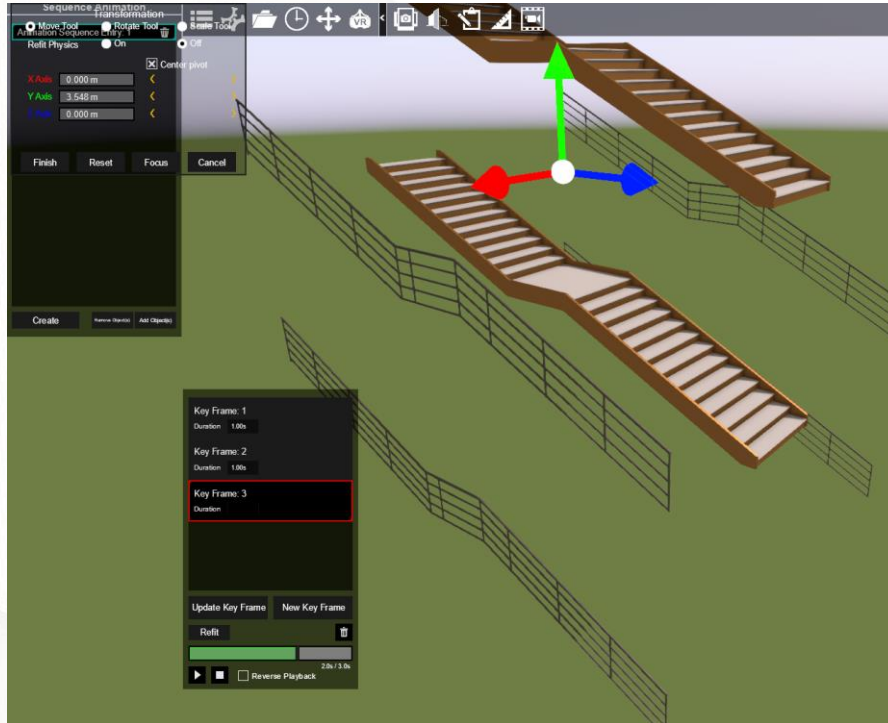
3 Construction Sequence Simulation

3.6 Sequence Animation

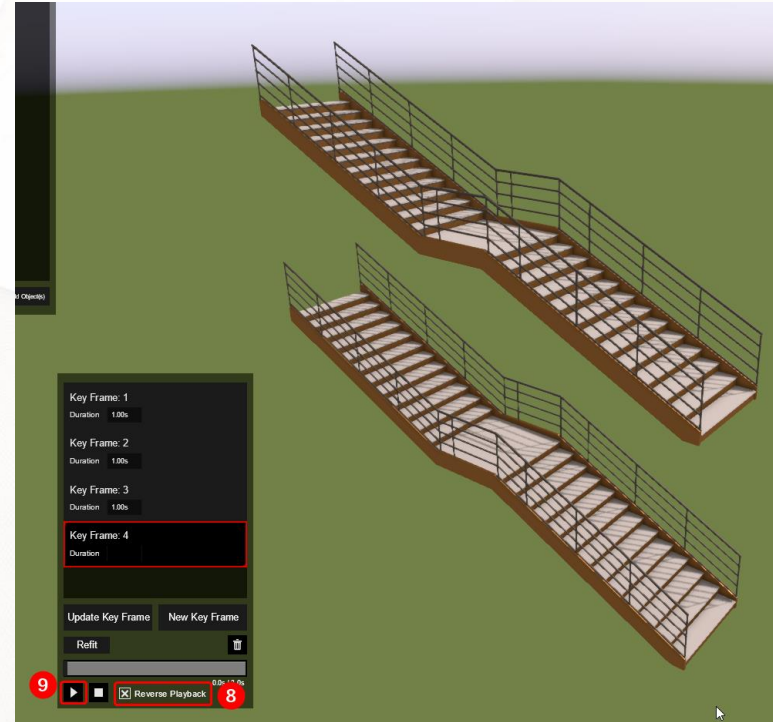


3 Construction Sequence Simulation

■ 3.6 Sequence Animation



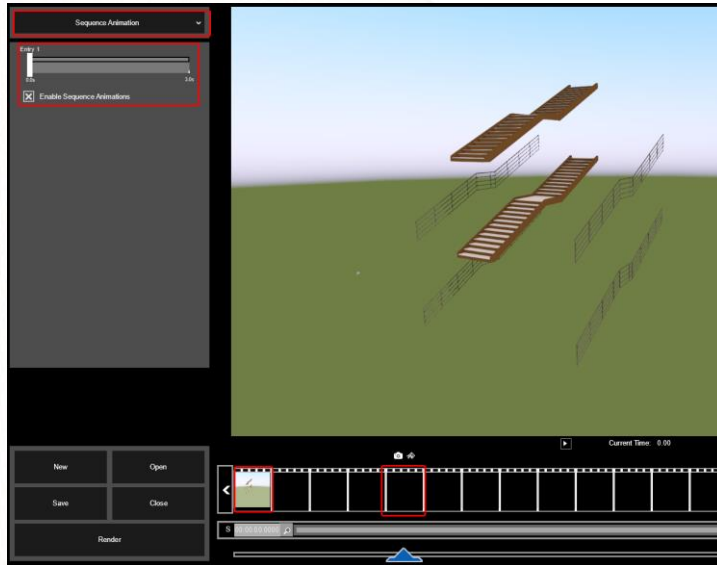
Same editing for the rest elements.



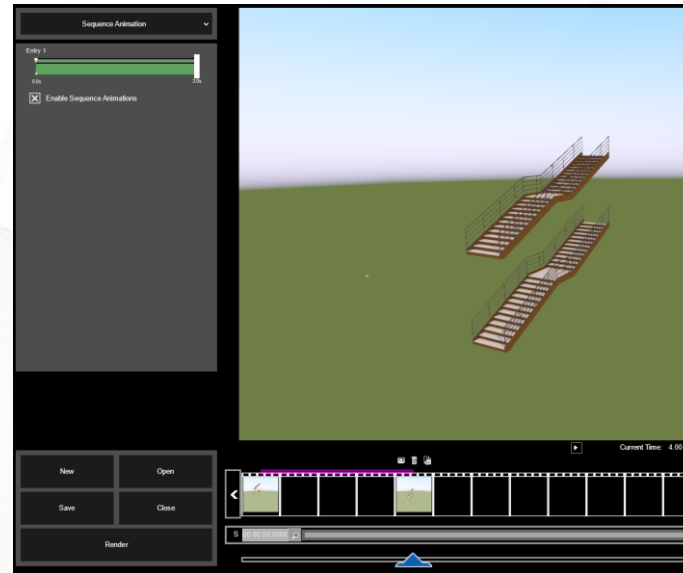
Play the animation reverse backwards.

3 Construction Sequence Simulation

■ 3.6 Sequence Animation



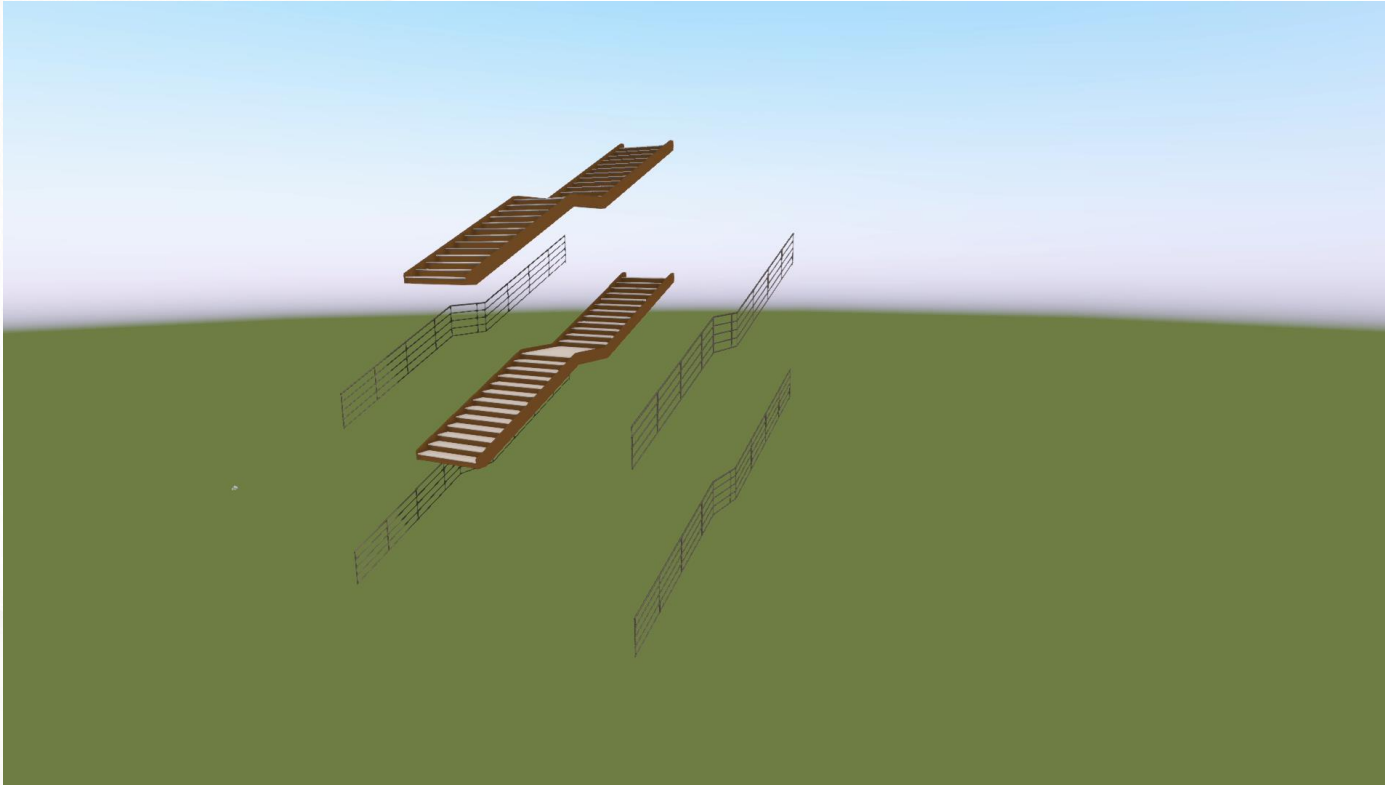
Capture the first position of the sequence animation.



Capture the last position of the sequence animation.
You may adjust the frame capture to control the time and duration of the animation.

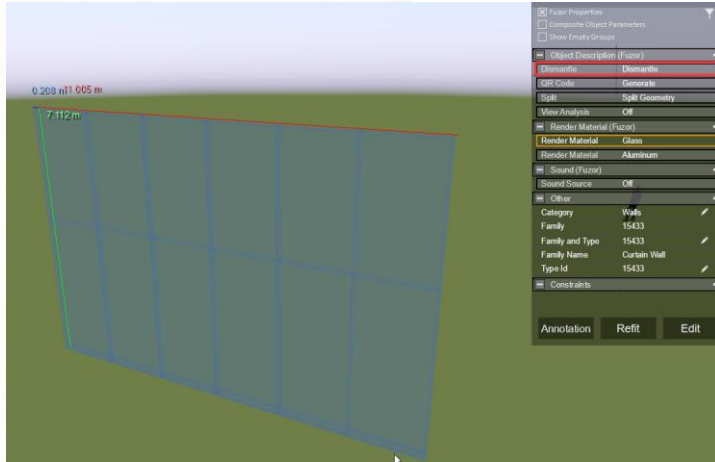
3 Construction Sequence Simulation

- 3.6 Sequence Animation

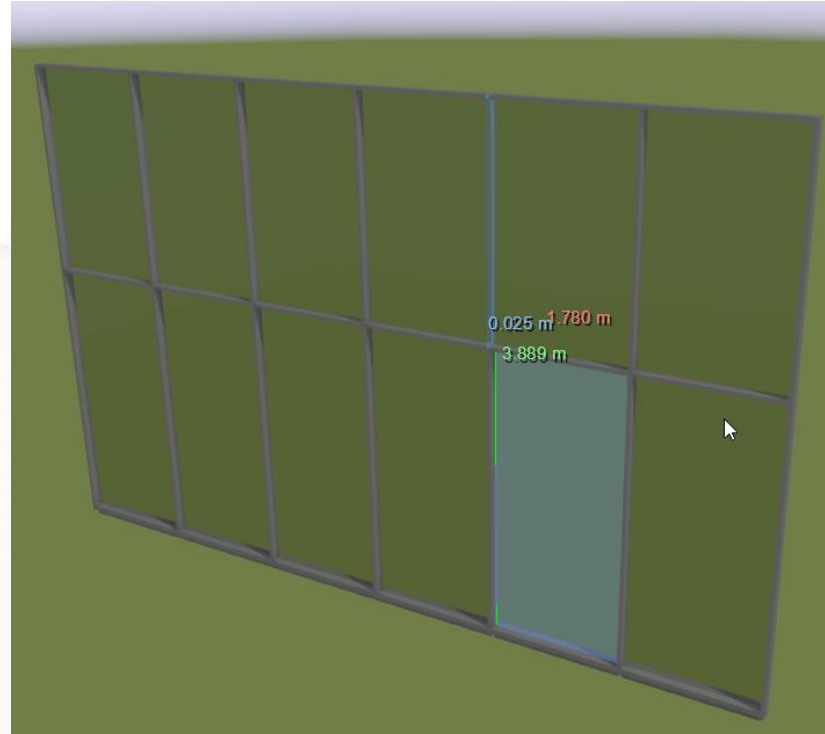


3 Construction Sequence Simulation

■ 3.6 Sequence Animation



Make use of "Dismantle" to break down the system family to parts.



4 Virtual Reality and Mixed Reality

■ 4.1 Introduction to different VR, AR, MR headsets

- Virtual reality (VR)
- Augmented reality (AR)
- Mixed reality (MR)

Fuzor currently supports the following VR, MR and AR platforms:

- HTC Vive
- Oculus Rift and Touch
- Microsoft HoloLens
- Windows Mixed Reality
- Google Cardboard



4 Virtual Reality and Mixed Reality

4.2 Difference between operation in VR and PC

- Please refer to the table below to check what are the changes that can or cannot be shared with the collaborator. Please note that only changes made by the presenter can be viewed by the collaborator.

	In VR	On PC
Move object	✓	✓
Undo move object	✗	✓ (Ctrl+Z)
Visibility	✓	✓
Material change	✓	✓
Undo material changes	✓	✗ (Ctrl+Z)
Add Landscape	---	✓
Delete Landscape	---	✗
Undo Landscape	---	✗ (Ctrl+Z)
Add object from content library	✗	✗
Add object from family placement	---	✓
Create light through light control	---	✗
Toggle Light	✓	✓
Day of Time / Weather	✗	✓

	In VR	On PC
4D simulation	✗ only landscape can be seen	✗ only landscape can be seen
Sequence Animation	✗	✓
Custom Animation	✗	✗
Vehicle Animation	✗ because 4D simulation is not shown	✗ because 4D simulation is not shown
Avatar Mode / Type	---	✗
Object Sound	✗ except the music is in the file at the beginning	✗ except the music is in the file at the beginning
Markup	✗	---
Annotation	---	✓
Add Annotation on an object which has been annotated by another collaborator	---	✗
Delete	---	✓
Alt-click	---	✓
Logo on construction worker (avatar)	✗	✗

4 Virtual Reality and Mixed Reality

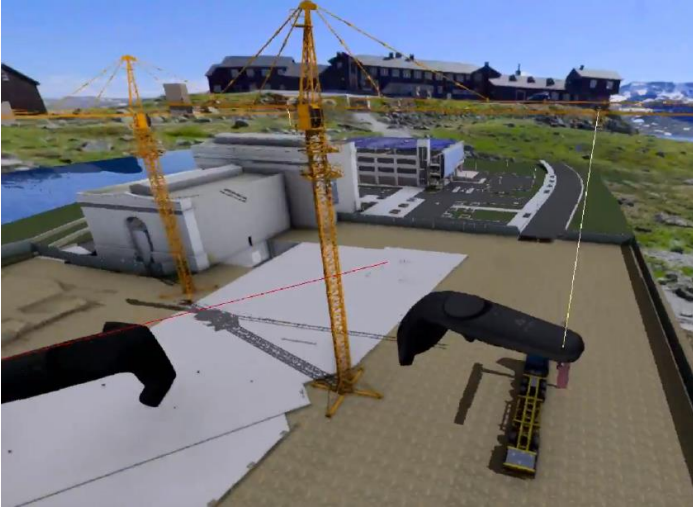
■ 4.3 Use VR for architectural review



<https://www.youtube.com/watch?v=Vdp2Xp3dJeA>

4 Virtual Reality and Mixed Reality

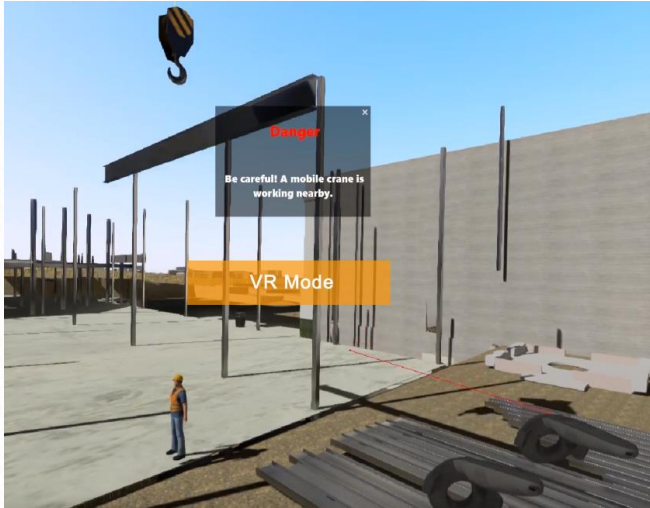
- 4.4 Use VR for construction sequence simulation



<https://www.youtube.com/watch?v=Sr61Q9da4xY>

4 Virtual Reality and Mixed Reality

■ 4.5.1 Trigger system for VR training



https://www.youtube.com/watch?v=ijm_DBNEZIo

5 Collaboration

■ 5.1 Real-time collaboration (Peer-to-Peer)



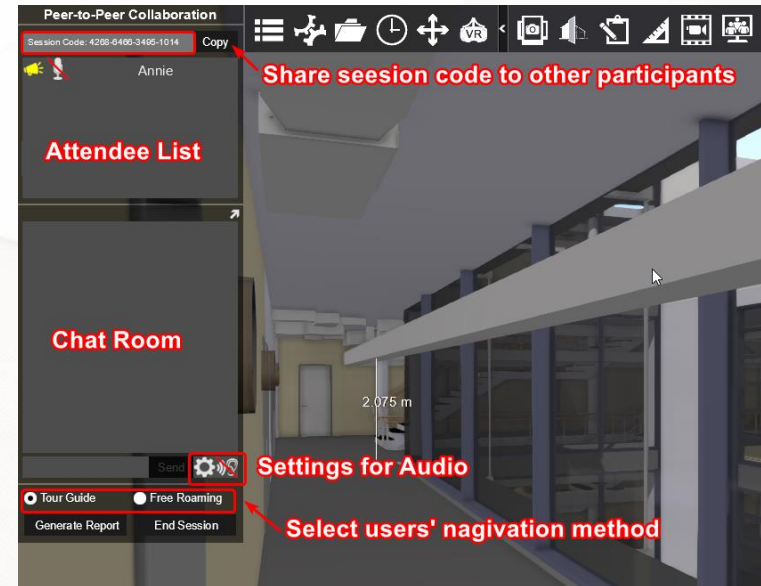
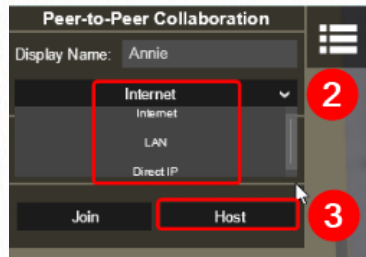
- "Peer-to-Peer Collaboration" allows multiple users to navigate in the same file at the same time regardless of their physical location.
- Users can mark issues and make design changes with everyone's presence in the file. These changes will be reflected immediately for collaborators to review.
- Peer-to-Peer Collaboration has three easy ways to host/connect:
 - Internet connection
 - LAN connection
 - Direct IP
- Note: Fuzor VDC or Fuzor Ultimate is required to host a Peer-to-Peer Collaboration session. However, any version of Fuzor (VDC, Ultimate, BIM, Design, VRC , Collaboration Viewer) can join a Peer-to-Peer Collaboration session.

5 Collaboration

- 5.1 Real-time collaboration (Peer-to-Peer)
 - 5.1.1 Start Peer-to-Peer

To host a collaboration session

- 1 *Open Fuzor model*



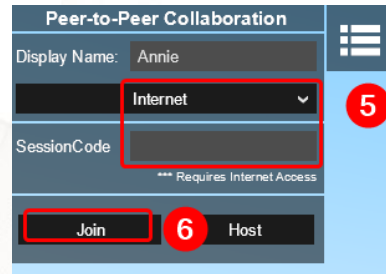
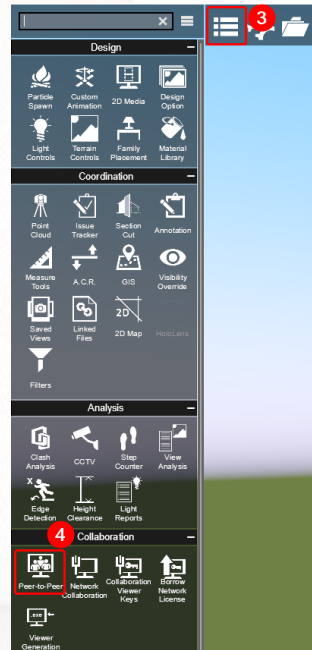
5 Collaboration

5.1 Real-time collaboration (Peer-to-Peer)

5.1.1 Start Peer-to-Peer

To join a collaboration session

1 *Open Fuzor software*



5 Collaboration

- 5.1 Real-time collaboration (Peer-to-Peer)
 - 5.1.1 Start Peer-to-Peer

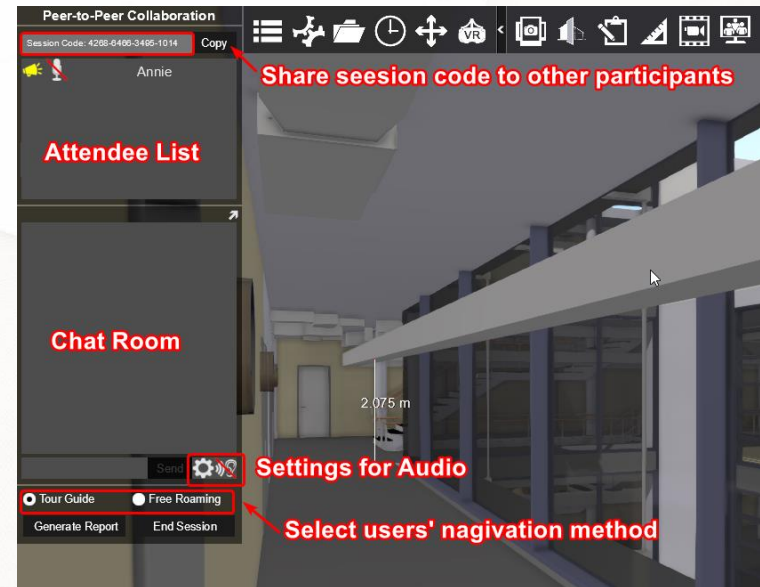
Tour Guide:

Lock guests to the host avatar's position;
however, users still have control over their camera view.

Free Roaming:

All users within the session to navigate the project freely.
All users to annotate problem areas and add callout markers.

Note: Only the "Presenter" has this ability to switch to and from "Tour Guide" and "Free roaming" (Host will be the "Presenter" when the collaboration

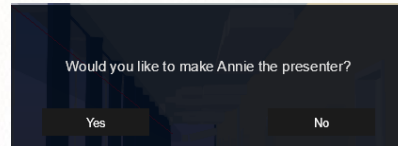


5 Collaboration

- 5.1 Real-time collaboration (Peer-to-Peer)
 - 5.1.2 Tour Guide Mode

*Lock guests to the the host avatar's position.
However, users still have control over their camera view.*

*Clicking the Presenter bulb to
change presenter*



*Only the "Presenter" has this ability
to switch to and from "Tour Guide"
and "Free roaming"*



Host: David

From Annie's Viewpoint

5 Collaboration

- 5.1 Real-time collaboration (Peer-to-Peer)
 - 5.1.3 Free Roaming Mode

All users can navigate the project freely within the session.
All users can annotate problem areas and add callout markers.

Jump to other user viewpoint by clicking their name



From Annie's Viewpoint

5 Collaboration

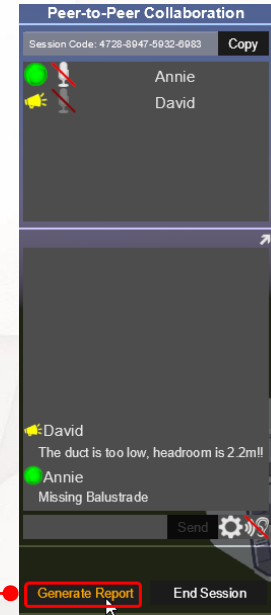
- 5.1 Real-time collaboration (Peer-to-Peer)
 - 5.1.4 Peer-to-Peer Report

Fuzor Synchronous Collaboration Report - rme_advanced_sample_project.rvt

Time Started	4/24/2019 4:08:43 PM
Time Ended	4/24/2019 4:09:55 PM
Duration	00:01:12

Timestamp	Username	Action	Content
4/24/2019 4:08:46 PM		Change Mode	Tour Guide
4/24/2019 4:08:46 PM	Annie	Join Session	Annie
4/24/2019 4:08:46 PM	David	Join Session	David
4/24/2019 4:09:11 PM	David	Chat	The duct is too low, it should maintain 2.2m headroom!
4/24/2019 4:09:38 PM	Annie	Chat	Missing Balustrade

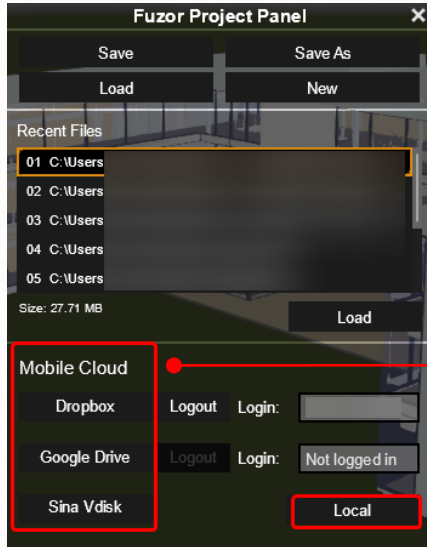
Chat record in html format



5 Collaboration

▪ 5.2 Fuzor mobile

- 5.2.1 Save as Mobile Viewer File



If files are saved in Dropbox or Google Drive, Fuzor mobile can read the specific file format quickly.

If files are saved in local, users need to save the file in mobile by other means.

5 Collaboration

- 5.2 Fuzor mobile
 - 5.2.2 Mobile Viewer



Fuzor Mobile Free

Kalloc Studios Business

3+

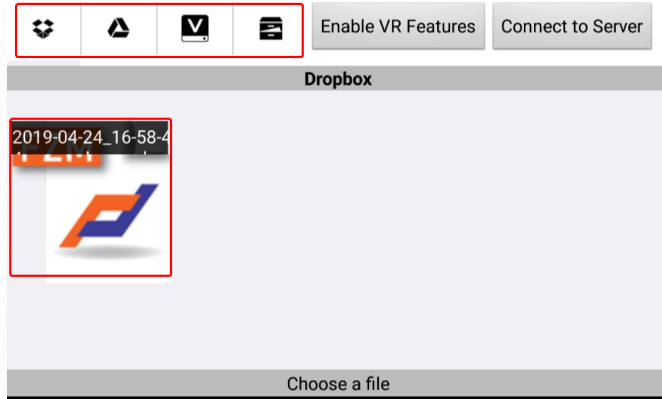
Offers in-app purchases

 This app is compatible with your device.

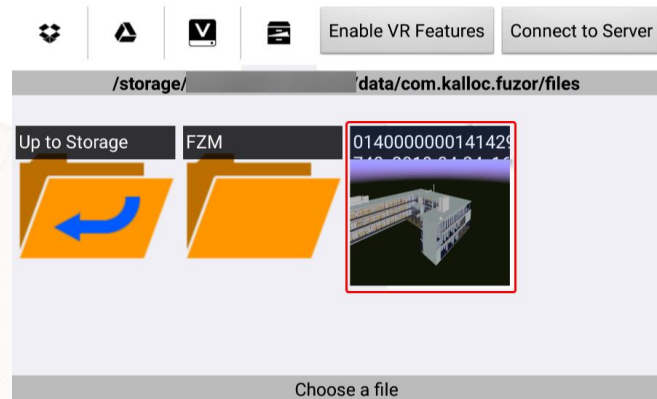
5 Collaboration

▪ 5.2 Fuzor mobile

- 5.2.3 Review Model



Linked with Dropbox, Google Drive, Sina Vdisk



Files downloaded from cloud or storage folder for

5 Collaboration

- 5.2 Fuzor mobile

- 5.2.3 Review Model



5 Collaboration

■ 5.3 Issue Tracking

Construction Field Deployment



Architectural Design Team



Fuzor connects AEC stakeholders together with BIM technology



Engineer Team



AM/FM Deployment

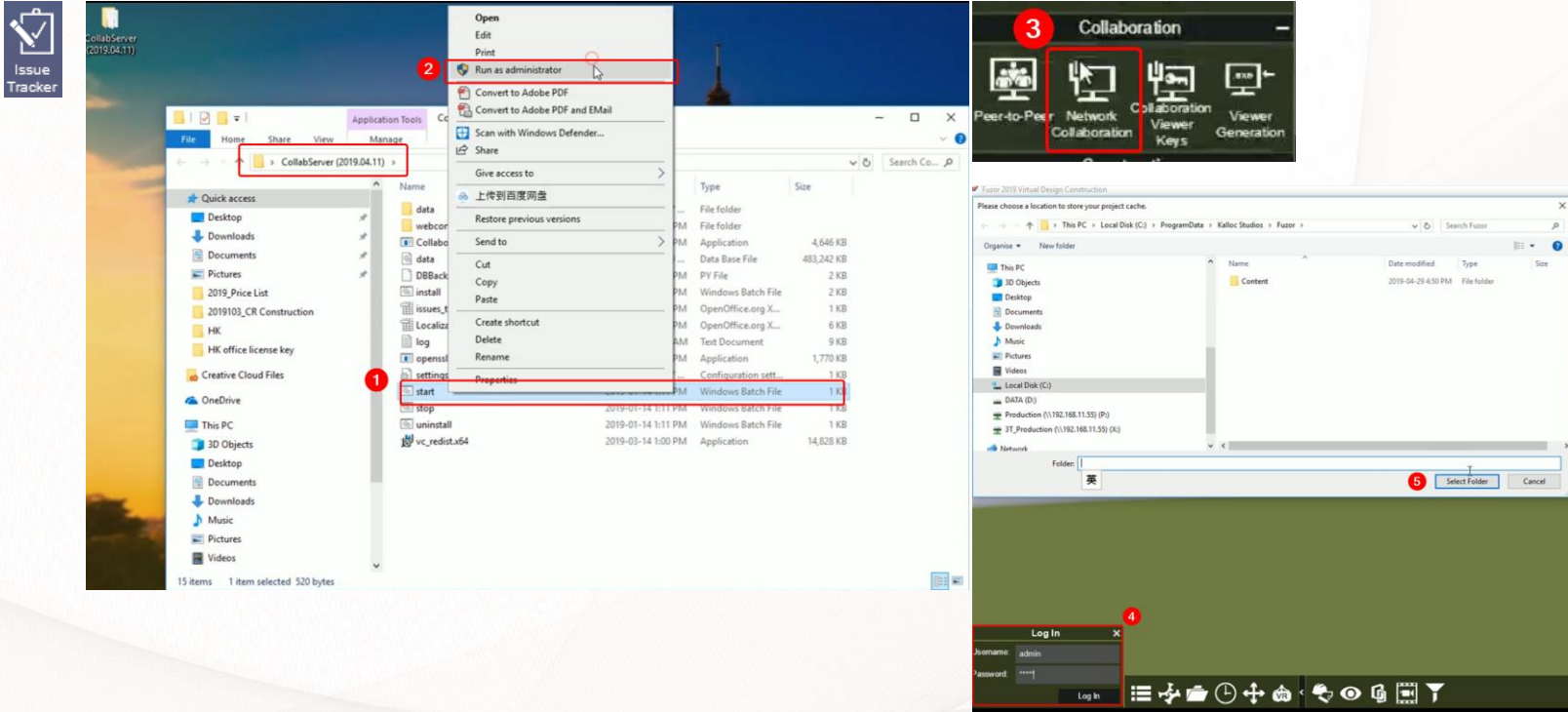


Construction Management Team



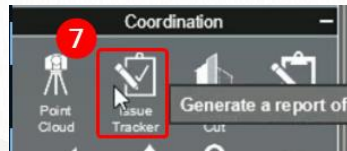
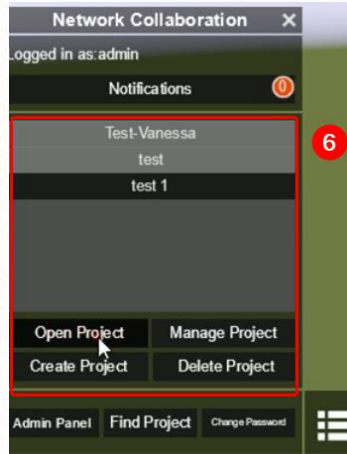
5 Collaboration

5.3 Issue Tracking



5 Collaboration

5.3 Issue Tracking



5 Collaboration

5.3 Issue Tracking

ID	Title	Status
3	Test	Open

1 / 1

Issue Filters

Status: All Assign To: All

Priority: All Category: All

Reported By: All Type: All

Company: All

Required By: Title:

Apply Clear

ID	Title	Status
3	Test	Open

1 / 1

Issue Filters

Status: All Assign To: All

Priority: All Category: All

Reported By: All Type: All

Company: All

Required By: Title:

Apply Clear

ID 3

Status:

Type: RFI

Company: Example Company

Priority: Critical

Category: Architectural

Reported By: admin

Assignees: Tester;

Add Tester

Created On: 5/2/2019 4:55:08 PM

Last Modified: 5/2/2019 4:55:08 PM

Required By: 5/9/2019

Title: Test

Markup:

Description: Example Description

Attachments:

test1.jpg

2DMI-198694.png

3DMI-198694.png

5 Collaboration

■ 5.3 Issue Tracking



Reference

Fuzor Video Tutorials

- <http://www.kalloctech.com/tutorials.jsp>

Fuzor Support Forum

- <https://images.kalloctech.com/posts/list/178.page;jsessionid=807A63543E8985FF6227BFE17C89F51A>



Thank You!

Extended Topic

Trigger system

Fuzor VDC - Event Trigger

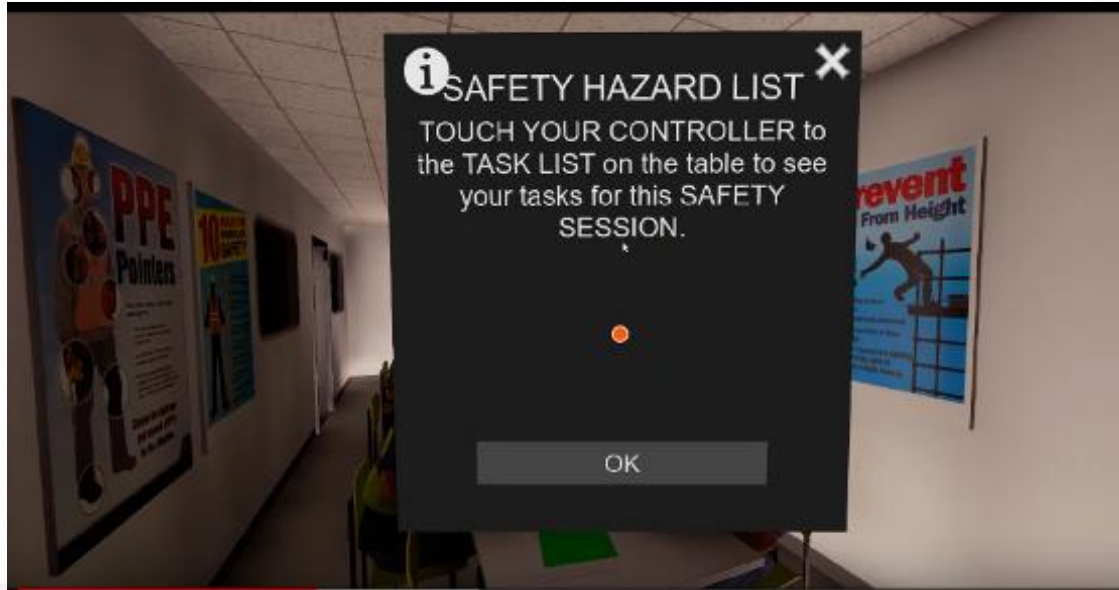
- > Construction Safety

- > Site Logistic

- > Installation Simulation

Construction Safety

- <https://www.youtube.com/watch?v=KgLYxaW51Gw&list=PLcfi2twSmE9J0wZN-wDMxIMlvENDwSnFM&index=44>



How to...

- Pop up a dialog after loading a cache file
- Create different types of dialog
- Click dialog button to enter VR
- Pop up a dialog by using different event type
- Trigger an animation when touching an object
- Change visibility of objects

Event Trigger

- To trigger actions when meeting the requirement of the events



•Pop up a dialog after loading a cache file

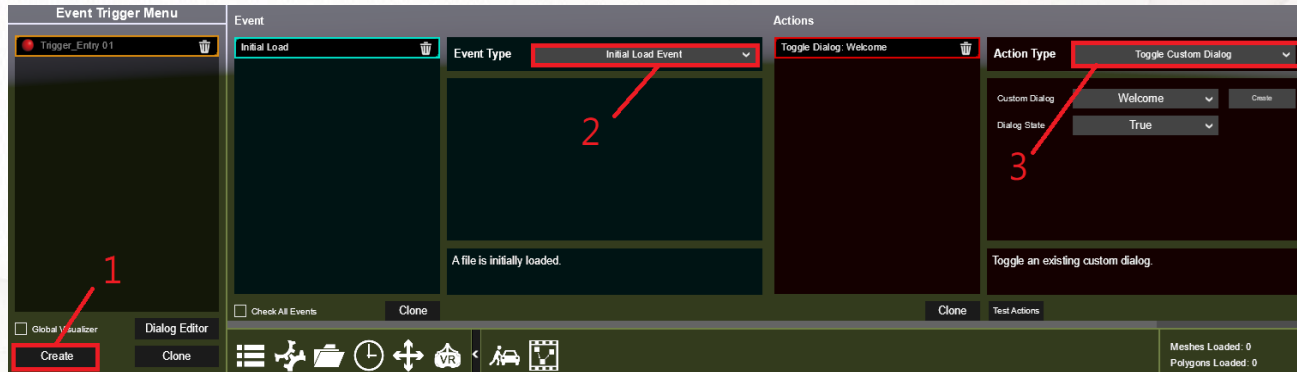
- Four steps to create trigger

-Create

-Add Event

-Add Action

-Turn on the Trigger

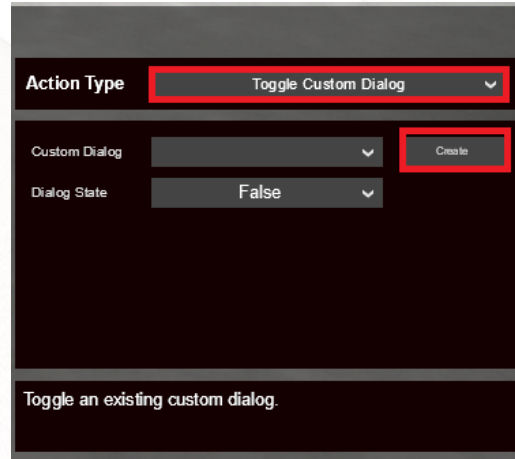


Create a Trigger Dialog




Method 1



Method 2










Dialog Editor

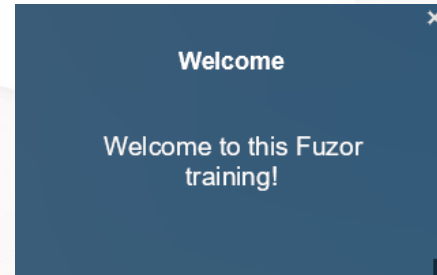
a	Title of the Dialog	Click to edit the dialog. Double click to change the dialog title. This is the title that would appear in the drop down box for "Toggle Custom Dialog" in Action Type
b	Global Title	Click to change all the font and font color of ALL the dialog title
c	Global Message	Click to change all the font and font color of ALL the dialog message
d		Click to delete the dialog
e	Dialog Type	Click to choose the dialog type
f		Click to change all the font and font color of the selected dialog title
g		Click to change all the font and font color of the selected dialog message
h	Dialog title and message	Click to enter the dialog title and message
i	Preview	Click to preview the dialog. You can also adjust the location and the size of the dialog box
j	Create / Save	Click to create a new dialog or save the changes
k	Cancel	Cancel the changes

Pop up a dialog when opening Fuzor

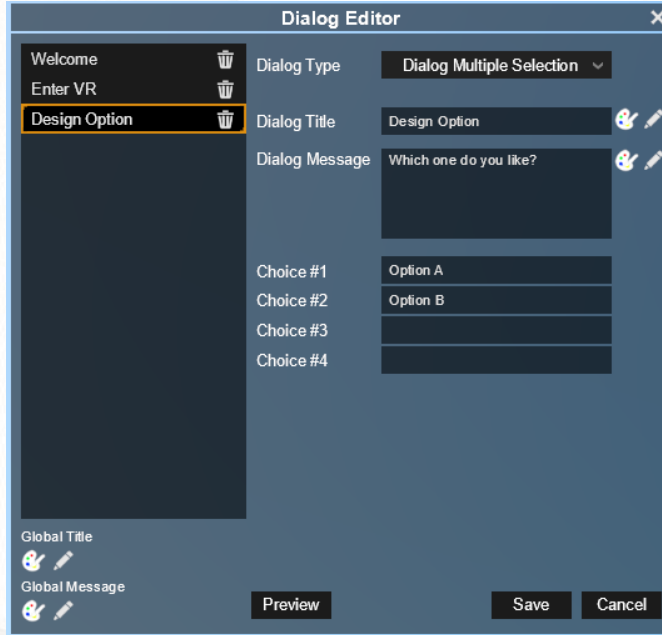
- Event Type: Initial Load Event
- Action Type: Toggle Custom Dialog
 - > Custom Dialog: choose the dialog title
 - > Dialog State(True = show dialog; False = hide dialog;
Toggle = show and hide dialog in turn)

Event		Actions	
Initial Load 	Event Type: Initial Load Event 	Toggle Dialog: Welcome 	Action Type: Toggle Custom Dialog 
			Custom Dialog: Welcome  
			Dialog State: True 
A file is initially loaded.		Toggle an existing custom dialog.	

Dialog Type 1: Dialog Basic



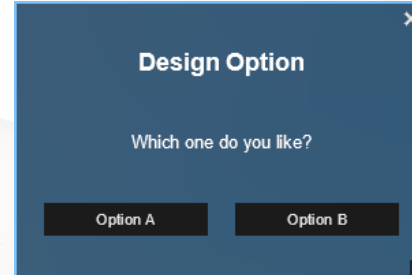
Dialog Type 2: Dialog Multiple Selection



The **Dialog Editor** window shows the configuration for a dialog. On the left, a list of dialog elements includes 'Welcome', 'Enter VR', and 'Design Option', with 'Design Option' selected and highlighted by an orange border. The main configuration area on the right is for the selected dialog and includes the following fields:

- Dialog Type:** A dropdown menu set to 'Dialog Multiple Selection'.
- Dialog Title:** A text field containing 'Design Option'.
- Dialog Message:** A text area containing the message 'Which one do you like?'.
- Choices:** A list of four choice slots. The first two are filled with 'Option A' and 'Option B' respectively, while the last two are empty.

At the bottom of the editor, there are icons for 'Global Title' and 'Global Message', and three buttons: 'Preview', 'Save', and 'Cancel'.



The rendered dialog box, titled **Design Option**, displays the message 'Which one do you like?' and features two buttons at the bottom: 'Option A' and 'Option B'.

Dialog Type 3: Advance Multi-Selection

Dialog Editor

Global Title
Global Message

Dialog Type: **Advance Multi-Selection**

Dialog Title: **Construction Sequence**

Dialog Message: **Click to view the construction sequence**

Button Label:

Button Message:

Entries:

- Stage 1
- Stage 2
- Stage 3

Add

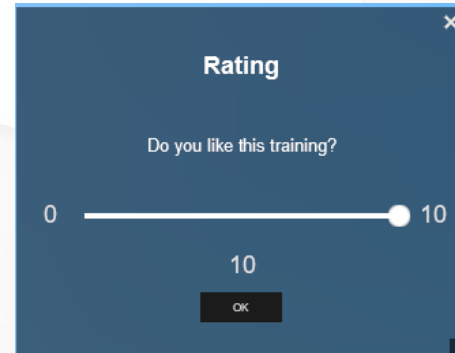
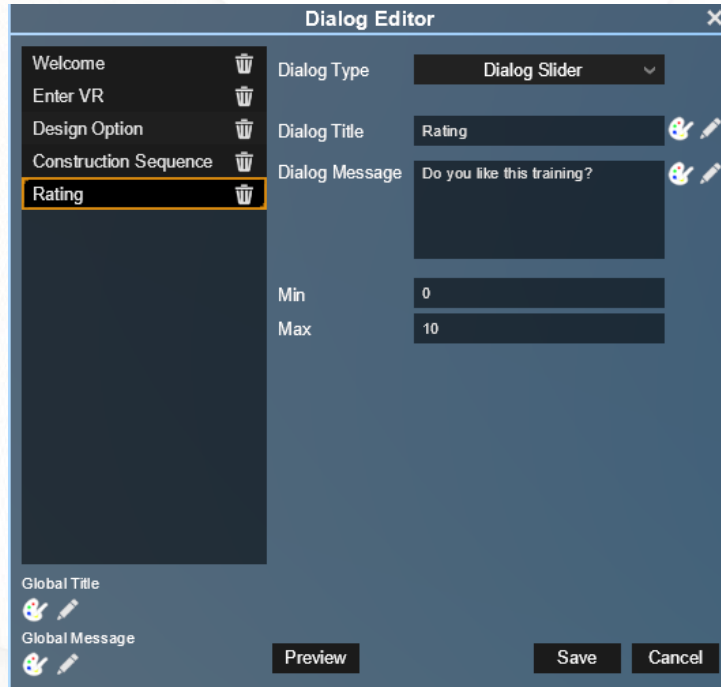
Preview **Save** **Cancel**

Construction Sequence

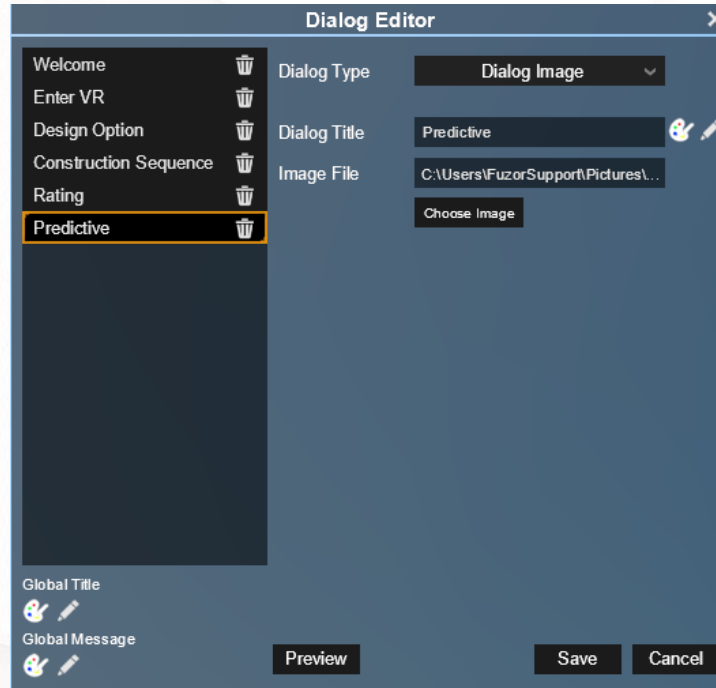
Click to view the construction sequence

Stage 1	Execution of Plastic Concrete Piles
Stage 2	Execution of Tube a Manchette Grouting
Stage 3	Wall Foundation after Completion

Dialog Type 4: Dialog Slider



Dialog Type 5: Dialog Image



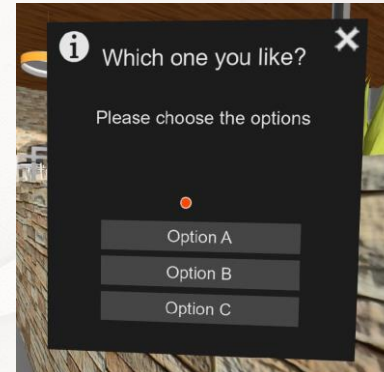
VR Dialog

Action Type: Toggle VR Dialog

- Yes or No VR Dialog
- Slider VR Dialog
- Multi-Choice VR Dialog









Action Type	Toggle VR Dialog	
VR Dialog	Training Completed	Create
VR Dialog State	True	

Toggle a VR Dialog's state.



Click Dialog Choice to Enter VR

- Event Type: Multi-Choice Dialog Entry Clicked
- Action Type: Change VR Mode

Event		Actions	
Custom Dialog Button Pressed: Yes 	Event Type Multi-Choice Dialog Entry Clicked 	Set VR Mode: enabled 	Action Type Change VR Mode 
	Custom Dialog Enter VR  		VR Mode True 
	Choice Yes 		
A custom dialog choice button has been pressed.			Change the current VR mode (only works in VR).

Trigger Action when Two Objects Collide

- Event Type: Object Collision
- Trigger action(s) when Object #1 and Object #2 collide with each other

Event Type	Object Collision ▼	
Object #1	▼	Add Selected
Object #2	▼	Add Selected
Precise Colliders	False ▼	

Trigger Action with Proximity

- Event Type: Object Proximity

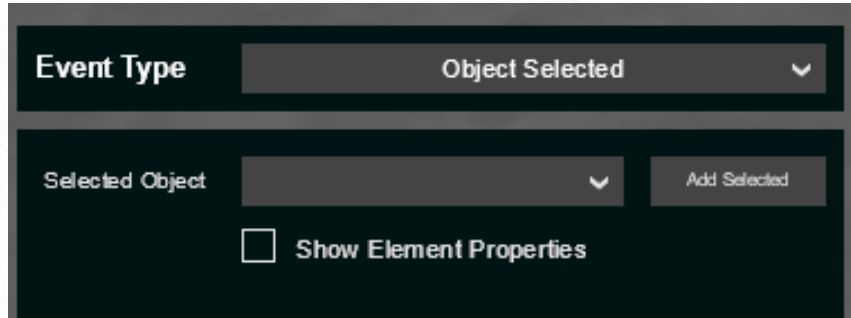
–Trigger action(s) when the distance (radius) between Object #1 and Object #2 meets the requirement (Enter / Leave the Range)

Event Type	Object Proximity ▼	
Object #1	View Camera ▼	Add Selected
Object #2	4448584661131715790 ▼	Add Selected
Radius	3	Meters (m) ▼
Proximity Type	Enter the Range ▼	

Trigger Action when selecting an object

- Event Type: Object Selected

-Trigger action(s) when an object is selected



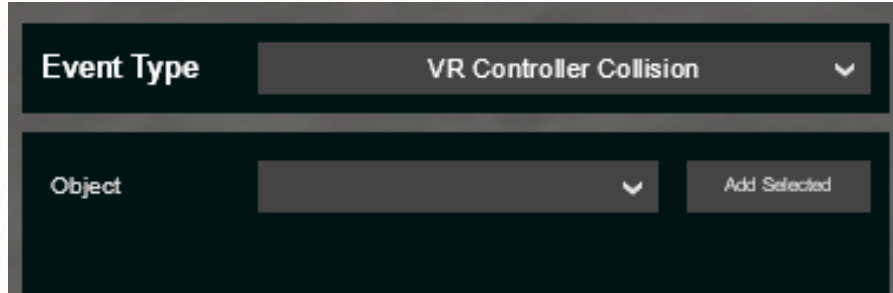
The image shows a dark-themed configuration panel with the following elements:

- Event Type:** A dropdown menu currently displaying "Object Selected" with a downward arrow icon.
- Selected Object:** A dropdown menu with a downward arrow icon, positioned next to the "Add Selected" button.
- Add Selected:** A button located to the right of the "Selected Object" dropdown.
- Show Element Properties:** A checkbox that is currently unchecked, followed by the text "Show Element Properties".

Trigger Action when colliding with VR Controller

- Event Type: VR Controller Collision

-Trigger action(s) when the selected object collides with the VR Controller

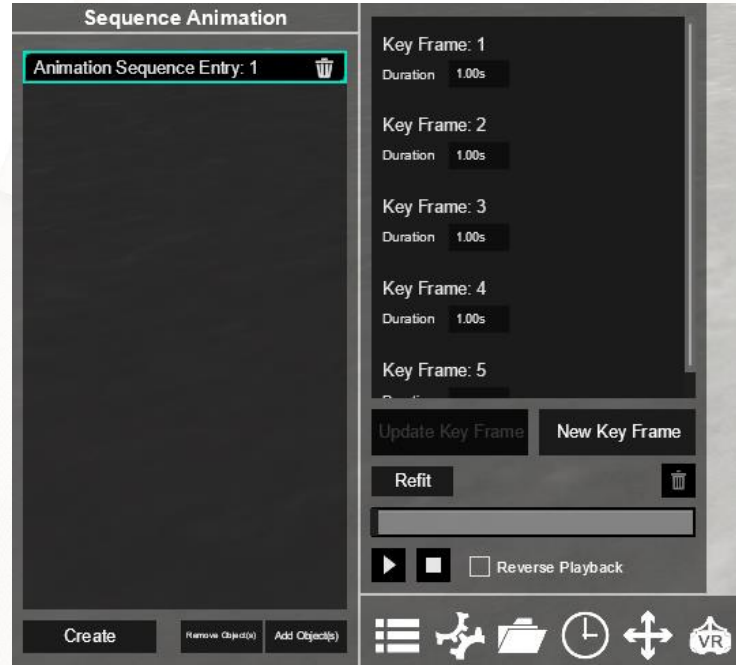


The image shows a dark-themed UI panel for configuring an event. It has two main sections. The top section is labeled 'Event Type' and contains a dropdown menu with 'VR Controller Collision' selected and a downward arrow. The bottom section is labeled 'Object' and contains an empty dropdown menu with a downward arrow, followed by a button labeled 'Add Selected'.

Event Type	VR Controller Collision	▼
Object		▼
	Add Selected	

Sequence Animation

- Steps:
 1. Create
 2. Refit
 3. Add New Frame



Trigger Sequence Animation

- Action Type: Play Custom Sequence

Action Type	Play Custom Sequence	▼
Custom Animation	Animation Sequence Entry: 1	▼

Change Object Visibility

- Action Type: Object Visibility

Action Type	Object Visibility ▼	
Object	4448584661131725025 ▼	Add Selected
Visibility	False ▼	

Construction Safety

- https://www.youtube.com/watch?v=ijm_DBNEZlo&list=PLcfi2twSmE9J0wZN-wDMxIMlvENDwSnFM&index=27




How to...


- Pop up dialog by using proximity
- Make sequence animation
- Play sequence animation with trigger
- Play construction animation with trigger
- Change visibility of objects
- Activate saved views
- Add and trigger sound


Play Construction Animation

- Play the construction animation of vehicles/equipment from the Fuzor library


Actions


Construction Animation: 241483995051843980 

Action Type Play Construction Animation 

Object 241483995051843980 

Add Selected

Animation Switch True 

Loop False 

Animation Sequence: Snap to Key Frame

- This action type will make the selected object in a sequence animation move to the location of the selected key frame in a desired duration

-Custom Animation: the name of the sequence animation

-Key Frame Entry: the key frame in the sequence animation

-Object: the selected object

-Duration: the duration for the object to move to the location of the key frame

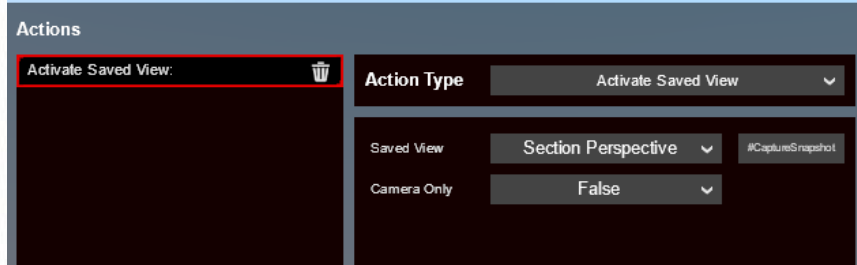
The screenshot shows a software interface with a dark blue header bar labeled 'Actions'. Below the header, there is a list of actions on the left and a configuration panel on the right. The selected action is 'Snap Keyframe: Animation Sequence Entry', which is highlighted with a red border. The configuration panel for this action is as follows:

Action Type	
Animation Sequence: Snap to Key Frame	
Custom Animation	Animation Sequence Entry: 1
Key Frame Entry	Key Frame: 1
Object	13931801347516433492 <small>Add Selected</small>
Duration	10 ms





At the bottom of the configuration panel, there is a description: 'Snap an object to an animation key frame.'

Activate Saved View

- Action Description: Jump the saved view
- Saved View: Name of the saved view
- Camera Only:
True = only move the view
False = move both the view and navigation mode

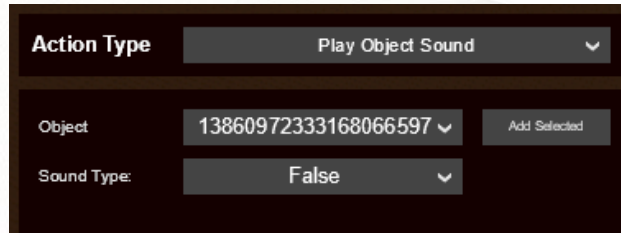
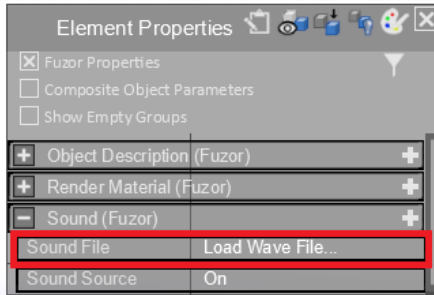


The screenshot shows a software interface with a dark theme. At the top, a header bar is labeled 'Actions'. Below it, a list of actions is shown. The first action, 'Activate Saved View', is highlighted with a red border and a trash icon to its right. To the right of this list, a configuration panel for the selected action is visible. It contains three settings: 'Action Type' set to 'Activate Saved View', 'Saved View' set to 'Section Perspective' (with a dropdown arrow and a small '#CaptureSnapshot' label to its right), and 'Camera Only' set to 'False' (with a dropdown arrow).

Actions	
Activate Saved View: 	Action Type Activate Saved View 
	Saved View Section Perspective  #CaptureSnapshot
	Camera Only False 

Trigger Sound

- Action Type: Play Object Sound
 - After loading a mp3/wav file to an object in the Element Properties box, use this action to trigger sound
- Object: the selected object with sound added
- Sound Type: True / False / Toggle



Site Logistic Trigger

- https://www.youtube.com/watch?v=BV_URyEzH4o&t=7s

